Permit Application Manual

(Updated 4/14/2020)

The purpose of this manual is to document policy and procedure for Department staff and the public when submitting, reviewing, processing, and making decisions about permit applications. The goal of this manual is to provide a unified resource which helps to promote consistency in relation to permit application processing within the Department. This manual is in no way a cookbook or replacement for critical thinking that is an essential component of water right processing, though this manual should serve as an aid in helping you to consider unique water right applications in a consistent manner.

This manual reflects the operational procedures/policies and final legal decisions that the Department is currently operating under during the processing of permit applications. This manual is not intended to provide step by step guidance in relation to accepting and processing permit applications. In any unique circumstances or situations where additional guidance is needed, please contact the Central Office to ensure that proper methodology and analysis is being followed.

Permits and Changes have been reviewed and issued by the Department since inception of the Water Use Act in 1973. While the criteria the Applicant must meet have remained the same, the level of analysis has changed through time and has become considerably more in-depth in recent years due to statutory changes and legal determinations. Much of what is contained in this manual is simply a re-formatting and compilation of past efforts the Department has made at documenting permit processing procedures.

It is recommended that you do not print this manual because the manual is constantly being improved and revised. Additionally, the content in the manual is linked to resources for easy navigation and these links are lost when printing. The Central Office will send out emails informing you of major updates or revisions.

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How to Use This Manual

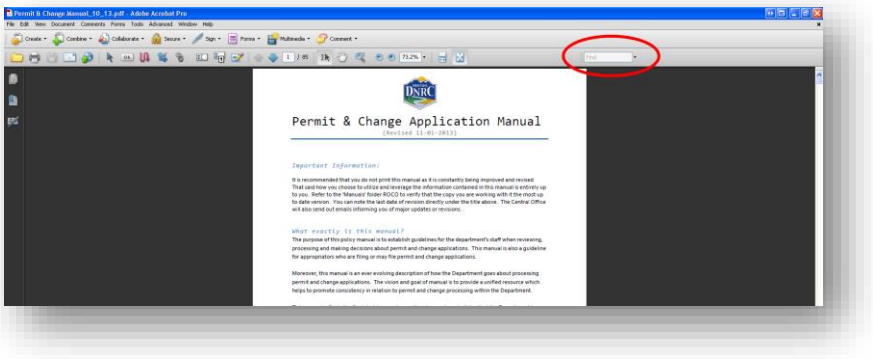
As described in the introduction, this manual is a one stop shop for information relating to how the Department should be processing permit applications. The following are some tips which may help you to find the information you are looking for more quickly and effectively.

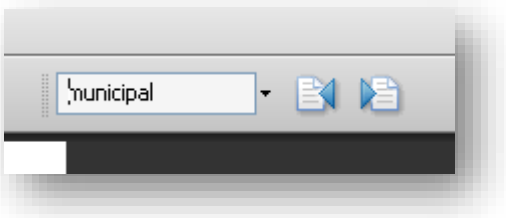
The Table of Contents is Clickable

All you have to do is click your mouse on an item in the table of contents and you will be taken to that area of the manual.

The Manual is Searchable

You can enter a search query in the area identified by the red circle below and then execute the query to find what you are searching for. For example, I entered "municipal" and was then able to cycle through all of the occurrences of the word (like) "municipal" in the manual by simply clicking the arrows as seen in the second image.

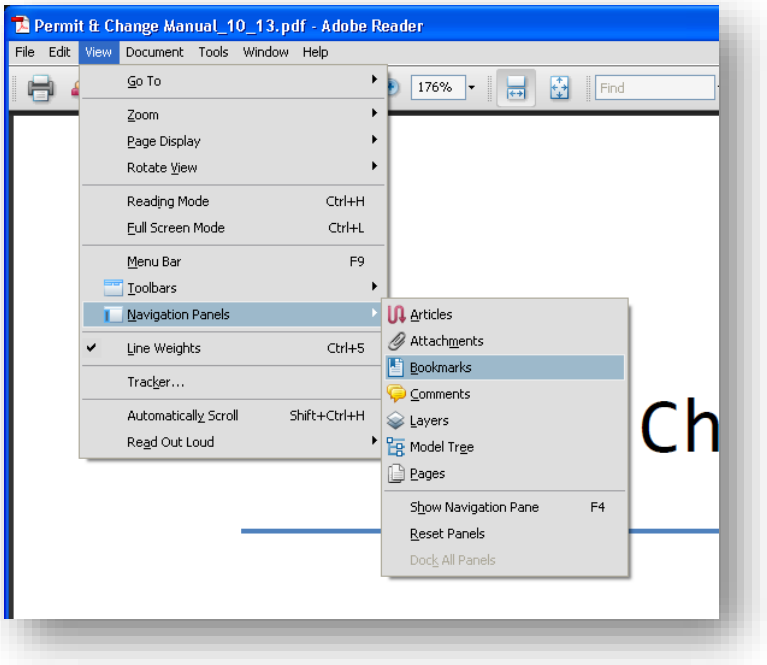




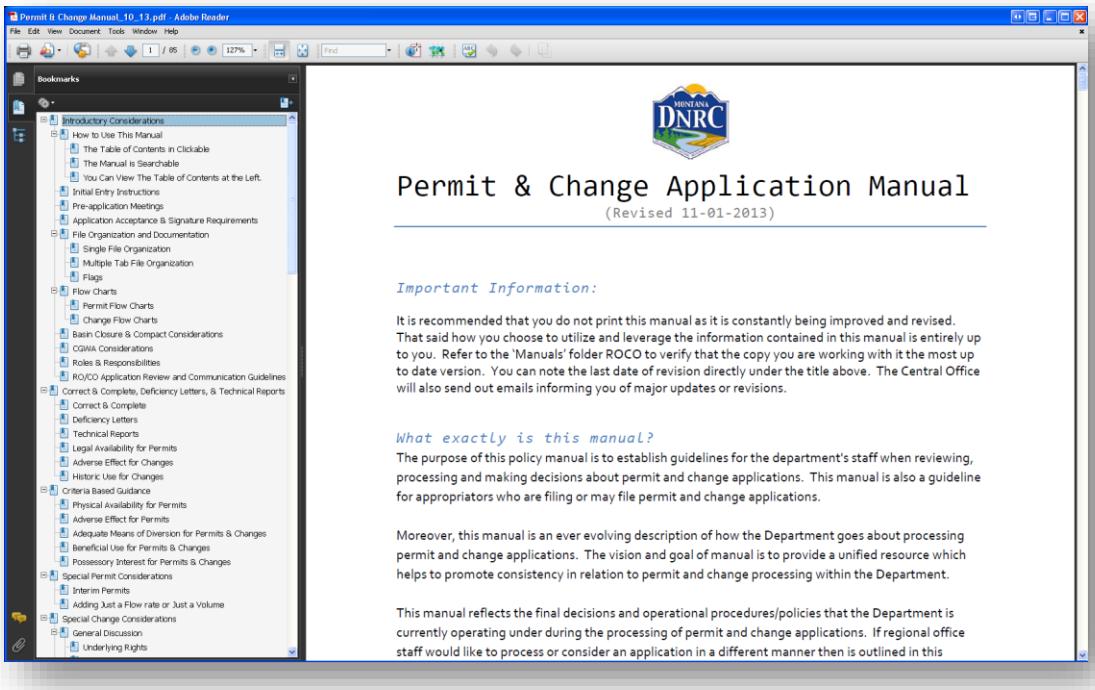
(Just click the arrows after your query to see where the word turns up)

You can view the table of contents at the left

It might seem like a pain to click on the Table of Contents and then be deep into the manual with no 'tabs' or easy navigation available except by scrolling all the way back to the Table of Contents and clicking again. To avoid this issue simply turn a Table of Contents on at the left in your screen. All you have to do is click VIEW---NAVIGATION PANELS---BOOKMARKS as seen in the following image:



Now no matter where you are in the manual you will have the ability to navigate within a bookmarked table of contents as seen in the image below:



Introductory Considerations

Application Processing Timelines & Flow Chart

The Department must maintain certain timelines when processing an application. These timelines are identified in statute (85-2-302, 85-2-307, MCA). Upon receipt of an application, the Department has 180 days to review the application and send a deficiency letter identifying any defects in the application. The Applicant has 120 days to respond and address all deficiencies identified in the deficiency letter. If the Department does not notify the applicant of any defects within 180 days, the application must be treated as a correct and complete application. A Correct & Complete letter will be sent to the Applicant along with a Technical Report and any other reports which will be used by the Department for analysis of criteria for issuance of the permit. Once the application is deemed correct and complete, the Department has 120 days to issue a decision in the form of a preliminary determination document (PDD). Assuming a PDD decision to grant, the application is prepared for and sent out to public notice. The notice period can be anywhere from 15-60 days, and the Department has concluded that the notice period will be 45 days unless the RO instructs otherwise for special circumstances. If no valid objections are received during public notice, the permit can be issued immediately with an adoption order. If valid objections are received, the hearings unit will handle the case.

If the PDD decision is to deny, a draft PDD is sent to the Applicant, and the Applicant then has the option to request a meeting within 15 days. If a meeting is requested, the Applicant may request, in writing, up to 60 days to provide follow-up information that could lead to a PDD to grant. If additional time is requested to provide additional information, the Applicant must submit a waiver of timelines form with that request. This is

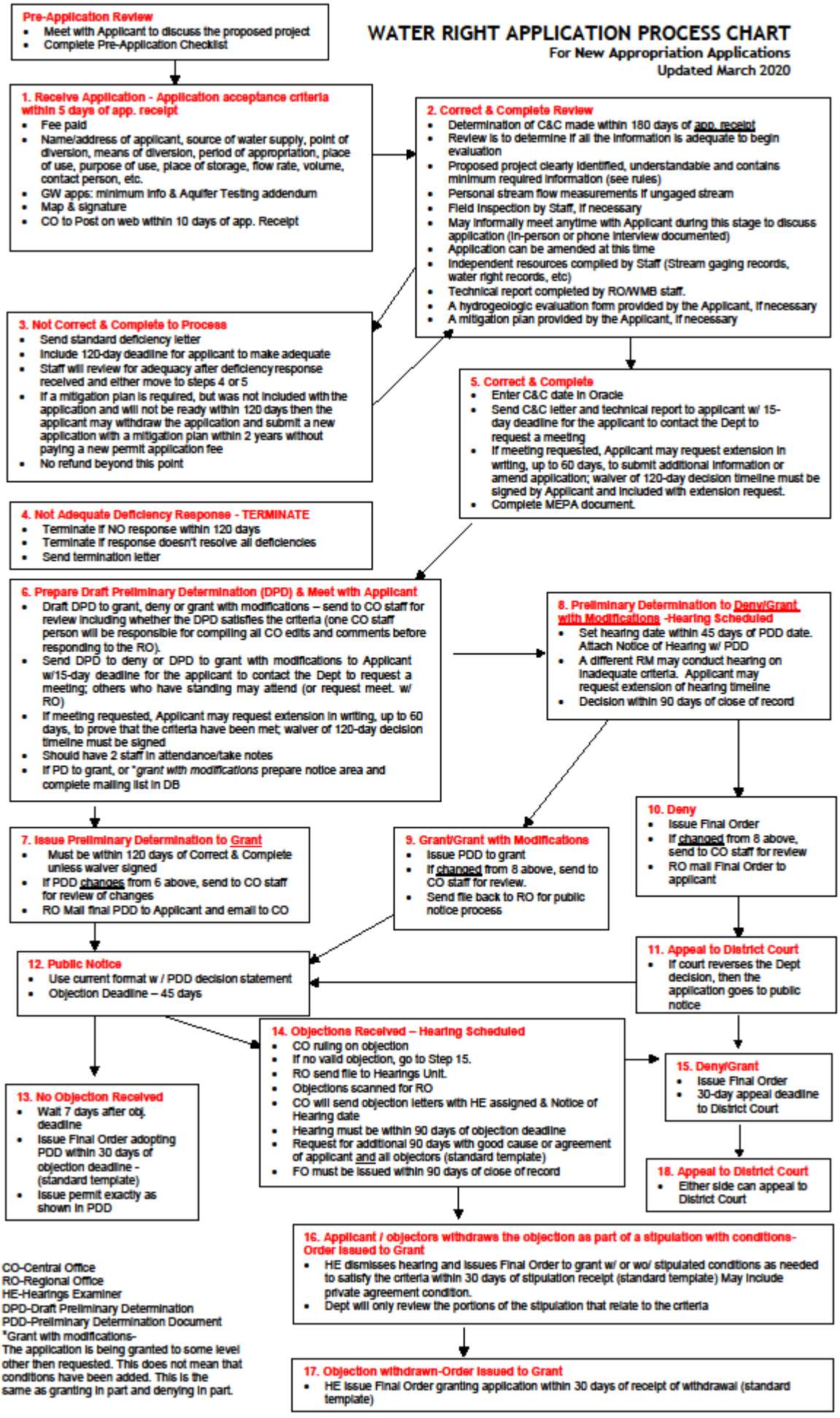
necessary to give the Department adequate time to review the additional information and complete the PDD taking into account the new information. The waiver of timelines form must be signed by the Applicant, or their Attorney if they are being represented by legal counsel. The Applicant may waive timelines at any point in the process once an application has been deemed Correct & Complete. An Applicant cannot waive any timelines prior to a Correct & Complete determination of the application. A waiver of timelines waives the 120-day statutory timeline set for the Department in issuing a decision on a permit. If an Applicant waives timelines on an application, staff processing the application should make every effort to complete review and draft a decision document in a timely fashion. If the draft denial proceeds to a PDD to deny, a hearing will be scheduled unless the Applicant chooses not to pursue the hearing.

The following flow chart outlines the steps in the permitting process. It can also be found as a .PDF document on the ROCO drive.

WATER RIGHT APPLICATION PROCESS CHART

For New Appropriation Applications

Updated March 2020



CO-Central Office
RO-Regional Office
HE-Hearings Examiner
DPD-Draft Preliminary Determination
PDD-Preliminary Determination Document
*Grant with modifications-
The application is being granted to some level other then requested. This does not mean that conditions have been added. This is the same as granting in part and denying in part.

Definitions

Definitions – Water right related definitions can be found either in Mont Code Ann. 85-2-102 or the Administrative Rules of Montana 36-12-101.

Affidavit / Unsworn Declaration

*Affidavits and unsworn declarations may be used interchangeably when processing NA applications and notices. Note that affidavits are notarized, but unsworn declarations are not. Instead of notarization, unsworn declarations must contain the following language: "I declare under penalty of perjury & under the laws of the State of Montana that the foregoing is true & correct." *Please note, if there is any concern that the person signing the document is not who it should be (i.e. the signature is a forgery!), you may require notarization.*

State Statute, Administrative Rule, Case Law and Department Policy

Applications are processed according to State Statutes, Administrative Rules, Case Law, and Department policy (memorandums or standard practice guidance documents) intended to clarify processes established by statute, rule, and case law. Statute is the law and is the final authority on any water rights issues or questions. Administrative rule is established as a guiding document designed to carry out the directives of statute when not explicitly defined. The process for creating and adopting Administrative Rule is defined in statute and rule carries the force and effect of law. Case Law is established through Final Orders issued through the Hearings Unit of the Department or through a determination made by a court. Department policy is adopted only in situations where Statute and Administrative Rule do not clearly define a process, or when Case Law modifies how we must look at something. Memos and standard practice guidance documents all fall under the category of department policy.

Roles and Responsibilities

Regional Office Staff

- Responsible for communications with Applicant. If an attorney is representing the Applicant, all communication on the application should be with the attorney. If the Applicant is represented by a consultant, the Applicant should be included on all communications (C.C.).
- Responsible for ensuring applications are correct and complete and later determining if the information contained within the application meet the criteria. The RO staff is also responsible for making recommendations about approval or denial of permit applications.
- The Regional Office (RO) staff is responsible for compiling a Technical Report that outlines what information is available and will be utilized to evaluate the criteria.
- RO staff and the RO manager as the decision maker will draft a Preliminary Determination which includes findings of fact (based on the information presented in the Technical Report and other information gathered by the DNRC and submitted by the Applicant) that state whether or not there is a preponderance of evidence that supports findings that the criteria for issuance of a permit have been met. If the information gathered does not show by a preponderance of the evidence that the criteria for issuance have been met, the Regional Office staff may need to craft either a Draft Preliminary Determination to deny the application or a Draft Preliminary Determination to grant with modifications based on the case specific circumstances.

Regional Office Manager

- Responsible for final approval or denial of authorizations.

Central Office Staff

- The Central Office (CO) staff is responsible for answering RO staff's questions which relate to: Processes, MCA, ARM, forms, addenda, policy, precedent, procedure, timelines, PDs, Oracle database entry. The Central Office is the clearinghouse for all application policy and procedural questions.
- Responsible for quality control and consistency involving permit and change applications.
- The CO staff manages the mailing and publishing of public notice of applications and determines if application objections are correct and complete.
- The Central Office is responsible for reviewing PDs and noting processing inconsistencies along with identifying concerns relating to policy, procedure, ARM & MCA.
- The Central Office also acts as a filter for the legal staff. If you have a "legal" question, make sure it either goes through the Central Office or involve CO in the conversation with legal.
- Policy matter should be addressed with the Water Rights Bureau Chief and regional managers

The Water Management Bureau (WMB)

- The WMB is responsible for answering regional office staff's questions which relate to: surface water measurement & calculation, aquifer testing requirements, evaluation of aquifer testing data. The WMB also completes technical hydrologic analysis and peer reviews of hydrologist specialists work as deemed necessary by the Water Management Bureau and the regional managers. The WMB is responsible for compiling the Aquifer Test Report and Depletion Report for groundwater applications as well.

Hearings Unit

- If the application is denied or granted with modifications and the Applicant requests a hearing, the Hearings Unit will conduct a hearing and issue a final order in the matter (show cause hearing).
- The Hearing Unit will also conduct hearings on applications which receive valid objections during the public notice period (contested case hearing).

The Applicant

- Responsible to provide all necessary information for a correct and complete application within the statutory timelines.

What to Send to Whom

Office Contacts: Jenn Daly: Billings, Helena, Missoula, Glasgow
Nate Ward: Bozeman, Lewistown, Havre, Kalispell
*While these are the initial contact persons, it is okay to contact the other or other members of CO for specific questions or topics or if the initial contact is unavailable.

Deficiency Letters: Do not need to be reviewed by CO staff, however, your normal office reviewer is always willing to be a second set of eyes if you'd like.

Technical Reports: Do not need to be reviewed by CO staff, however, your normal office reviewer is always willing to be a second set of eyes if you'd like. Offices are encouraged to send complicated Technical Reports in for review, so the CO is involved earlier in the process.

EAs: Do not need to be reviewed by CO staff, however, your normal office reviewer is always willing to be a second set of eyes if you'd like. Go to the MEPA webpage on the DNRC intranet site and use the online submission form to get the EA posted to the web.

PDs: Send PDs to your CO contact person and CC the bureau chief, program manager, and other program specialist. Do not send PDs to hearings examiners.

PN: Send a copy of the finalized PD in PDF format to your CO contact person along with a note that the PN is ready to go. The CO contact will forward the PN notice along to the hearings assistant for processing.

RO/CO Application Review and Communication Guidelines

- Include Regional Managers in CO decisions that affect policy or process.
- Regional and Central Office staff should be familiar with case law that is being cited in decisions.
- If case law changes or new case law is established, templates will be updated by legal or Central Office to incorporate it.
- Initiate discussion between RO and CO staff regarding when legal review is necessary. All draft denial PDs will need to be reviewed by legal.
- Decision making is the RO managers' responsibility.
- CO will review decision document drafts for consistency with regards to law, rule, and policy, and make suggestions for improvements as needed.
- If the manager has questions about whether a comment is a legal, policy, or consistency issue then they should discuss it with the CO.

Pre-application Meetings

Overview:

This meeting is an option offered to the Applicant with the incentive of a $200 reduction in the filing fee for attendance. In order to qualify for the reduced fee a signed copy of the pre-application checklist must be returned to the DNRC with a completed application within 6 months of the date of the pre-application meeting. It is preferred that the meeting be in person; however, if this is not possible, a conference call is acceptable. The DNRC encourages attendance by the Applicant's attorney, consultant, and any other individual with a detailed knowledge of the proposed project.

It should be made clear that the Applicant does have to provide some burden of proof to qualify for the reduction in the fee. If the Applicant and or his agents attend the meeting and offer an answer to each of the questions outlined on the Pre-Application Checklist, they will qualify for the fee reduction. The signature on the checklist attests to the fact that each item on the checklist was discussed and that the Applicant understands the options regarding each item discussed. If the ownership of the property involved changes hands, the pre-application meeting would remain valid as long as the project remains the same.

Make it clear that the DNRC is a neutral party and that we are here to educate and assist the Applicant. We need to remain fair and consistent in our dealings with the Applicant throughout the process and cannot appear as an advocate. If the answer to any question on the pre-application checklist is no, document why the details were not required for this application or if the Applicant needs to provide additional information.

Use the questions on the pre-application form to guide your agenda. These questions are loosely designed to identify the specific criteria that will have to be addressed to issue a water right. The Applicant needs to fully grasp all the criteria applicable to their proposed project. While the questions on the Pre-Application form are designed to guide discussion, they may not be adequate in situations which are complex. The Pre-Application meeting should be used to delve into the details of the proposal and explore areas of potential conflict or difficulties that may be foreseen with completing the application materials or project as the Applicant is proposing. This will help the Applicant prepare themselves and put together a more comprehensive application and hopefully avoid difficulties in processing once the application is received. Make sure that the Applicant has possessory interest, or the written consent of the person/persons with the possessory interest in the property where the water is to be put to beneficial use. You may want to discuss application processing steps and procedure. Make sure that the Applicant understands that "correct & complete" simply means that the information submitted conforms to the standard of substantial credible information and that all of the necessary parts of the form have been filled in with the required information. "Correct & complete" does not infer that a water right will be issued.

It is likely that you will meet with the Applicant prior to the pre-application meeting. For purposes of clarification, this type of meeting will be referred to as a scoping meeting. When and if you have such a meeting, make it very clear that a scoping meeting does not take the place of the pre-application meeting. The pre-application meeting should be set far enough in advance to allow the Applicant to assemble the necessary maps, measurements, and documents to present a complete picture of the proposed project. If the Applicant is not prepared, it is acceptable and encouraged to suggest that the Applicant may not be ready to submit an application; however, in the end it is the Applicant's choice.

It is highly recommended to set up a site visit, if needed, with Applicants to fully grasp and document the details of the proposed application. Work with your regional manager and the Applicant to ascertain when a field visit should take place.

Pre-Application Meeting Data Entry:

Following the pre-application meeting you will need to create a record of the event in the Oracle database. Listed below is the essential information that must be entered into the database. All other tabs will be unavailable until the Applicant returns with a completed application. You must enter ALL the required information before the database will allow you to save.

- Enter **Basin**
- Enter **Form Type** (600P)
- Enter **Date/Time Received**
- **Pre-Application Meeting Held event and date added programmatically** when leaving Date/Time Received text box
- Enter **Applicant Name (begin date automatically populated, based on time/date received)**

- ***SPECIAL NOTE:** Applicants may be added and deleted on the 600P at any time, allowing for easy Applicant modification. Once the application is converted to a 600, this functionality is disabled. This should assist when there is a discrepancy between the "Applicant name" at time of pre-app and the true Applicant name when the application arrives.*
- Enter **Representatives**
- Enter Representative's **Begin Date**
- Enter **File Location (date exists already, based on time/date received)**
- Enter **Regional Office** Processing File

Database Entry

During initial entry, staff enters 600P application type, navigates to Date/Time Received text box, and adds date/time. When navigating out of Date/Time Received text box, a form trigger adds ***Pre-Application Meeting Held*** event with event Date/Time and Response Due date. Event Date/Time is copied from Date/Time Received date. Response Due date is calculated (Date/Time Received + 6 months). Navigation then continues to Applicant tab, where Date/Time Received date is copied into begin date for each Applicant entered; this repeats for File Location entry. Tabs Water Rights, Notice List, Objections, Change Description, and Related Applications are disabled.

Once initial entry is complete, user saves entered data. Please note—After application 600P data are saved, when re-querying this type of application, Date/Time Received text box will not have a value.

Future Data Entry

When Applicant returns (with the completed application), staff queries data base for existing pre-application, updates the application type from a 600P to 600, and enters date/time received. Upon leaving Date/Time Received text box navigation triggers add a ***Form Received*** event using the added date from Date/Time Received. Changing application type from 600P to 600 re-enables tabs Water Rights, Notice List, Objections, Change Description, and Related Applications. Application form will now behave as it has done in the past for all 600 application types.

6 Month Expiration

If 6 months and 1 day passes without the 600P being updated to a 600, a "Pre-Application Meeting Expired" event will be automatically added to the event list. If a pre-application meeting expires, do not reuse the application number. If a new pre-application meeting is held, it will be assigned a new application number. This is important as it lets us track for statistical analysis.

Application Initial Entry Instructions

Sage Grouse Habitat Considerations:

If you receive a form 600, check the GIS layer to see if it is within a designated sage grouse area including Core Habitat, General Habitat, and Connectivity Areas. If it is not, accept the application and process it as you would normally. If the application does fall within a designated area, a letter from the Sage Grouse Habitat Conservation Program must be submitted with the application. If a letter is not submitted, the application must be rejected. Do not enter the application into the database. Return the application and refund the fee. If a letter is submitted with the application, then accept the application and process it as you would normally.

For any application that requires an EA be completed, in the "Unique, Endangered, Fragile or Limited Environmental Resources" section of the EA state whether the proposed use is in a sage grouse area as designated by the Executive Order. If it is, then state that the Applicant consulted with the Sage Grouse Habitat Conservation Program and that the information regarding the consultation (i.e. the letter) is in the file. MCA 85-2-307 requires that the Department post all applications for a permit or change on the Department's website. The following guidance explains exactly what must be initially entered for permits.

Received permit and change applications are posted to the Department's website every Monday morning.

The Central Office has an internal goal of posting received applications to the web within 10 days of application receipt.

There are clear requirements for the acceptance of an application described in ARM 36.12.1301. Statutory timelines begin the day an application is accepted, assigned a date received and given an application number. So, it's very important that an application meets all of the requirements for acceptance before it is initially entered.

Permit Application Initial Entry:

Posted permit applications contain an abbreviated abstract. Enter the main elements of the proposed permit application in their respective fields. For initial entry of a permit application you should enter:

Purpose(s) requested *(Required to be entered)*
Flow Rate requested *(Optional but recommended to be entered)*
Volume requested *(Optional but recommended to be entered)*
Source of water *(Required to be entered)*
Point of Diversion(s) (Qtr Sec/Section/Twp/Range/County) (Even a coarse description based on the submitted map(s) will work. Remember maps must conform to ARM 36.12.111 to accept applications) *(A minimum of the County is required to be entered, though a more precise point of diversion is preferred)*

Make sure all payment information is entered in database upon initial entry. Payment entry instructions can be found on the ROCO drive in the forms folder. The instructions are a word document found below all of the individual form folders.

Initial Application Review

The initial Application Review is to determine what processing steps the application requires and to find any deficiencies in the application. Make photo copies of the application material and stamp those copies WORK COPY. This provides a copy of the application where notes and modifications can be written on during the review process. Do not write on any of the original copies submitted.

These are the general steps of the Initial Review:

- Review all the forms and addenda thoroughly.
- Determine if the application requires the review of a staff hydrologist.
- Use the Administrative Rules and Statute that apply to the application to begin thinking about the application.

- If the application has some unique characteristic that falls outside of what you are familiar with talk with co-workers, office manager, central office staff or other specialists at different Regional Offices.
- Contact program management or legal staff to discuss applications that are unique or pose a complication.
- Do not send applications, or scanned copies of applications, to WMB until you are confident with the applications and can clearly communicate with WMB (orally or in writing) what they should be basing their calculations on and why.

Data Entry

- Fill in the Staff Processing Field under the Location tab in the database.

Staff Hydrologic Review

If a review by the staff hydrologists is needed, send the Application Folder or a copy with all the application material in it to the appropriate staff hydrologist for review as soon as possible once the application is received and appropriately initially reviewed. Alternatively, you may scan the file and send a link to WMB so they may view the file electronically. By a memo included in the file, describe why you are requesting a review by a staff hydrologist. Further explain any application details that you would like for WMB to consider in their calculations. It is up to RO staff to verify the completeness of applications prior to sending them to WMB.

Be certain to communicate any modifications to the application that takes place while the staff hydrologists are reviewing the application and after the hydrologic review. Minor changes may impact the determination from the hydrologist.

Data Entry

- Under the Events Tab, add a Sent to Department Hydrogeologist event and the date sent.
- Under the Location Tab, log the file out of Regional Office and to the Central Office (only if you are actually sending the file)

Basin Closure & Compact Considerations

Administrative Rule Closures: In highly appropriated basins & sub-basins the Department may close a basin by Administrative Rule (§ 85-2-319, MCA). In order to do so, the Department must receive a "*PETITION FOR CLOSURE OF A HIGHLY APPROPRIATED BASIN*", (Form 631). This form may be filed by the Department of Environmental Quality or by at least 25% or 10, whichever is less, of the users of the water in the source of supply within the basin or sub-basin for which the rules are requested. The petition must include facts showing that there is no unappropriated water, prior appropriators are being adversely affected, or that further use will interfere with planned uses or water reservations. Through the petition the Applicant(s) may request a complete closure to all new appropriations or condition the closure to require specific provisions in order to appropriate any new water. Some closures provide exceptions for municipalities, non-consumptive uses, domestic, stock storage during high spring flows, and groundwater. Within 60 days of receipt of the petition for Basin Closure, the DNRC is required to respond indicating that the petition is denied, accepted, or that additional information is needed.

***Legislative Closures*:** By law the legislature can preclude permit applications in a chosen drainage basin. Six basins have been closed by legislative action.

Department Ordered Milk River Closure: The legislature has given DNRC the authority to order closures within the Milk River basin. There are two DNRC orders closing portions of the basin.

Supreme Court Closure: The entire area within the confines of the Flathead Reservation is closed to any new appropriations of water by mandate of the Montana Supreme Court.

Compact Closures: Since its inception the Compact Commission has negotiated 17 compacts with six tribes and five federal agencies in Montana. 13 of these compacts have stipulations in them that close certain sources of water to new appropriations and regulate groundwater withdrawals.

High Spring Flow Exception in Closed Basins

Some basin closures have an exception to the closure for high spring flows. The high spring flow exception can be met if the Applicant presents information to show that the flow for that source is commonly above the average annual flow during the period of diversion for which they are applying. The Applicant must use the most representative gaging station to determine the average annual flow for that source. A representative gage is defined by being in the same geographic area and preferably in the same drainage area and/or by having similar characteristics to the area in which the water right is being applied for (similar slope, aspect, precipitation, geology, etc.).

Basin Closure Links:

Montana Basin Closures
§ 85-2-319, MCA
Form 631 – PETITION FOR CLOSURE OF A HIGHLY APPROPRIATED BASIN

CGWA Considerations

Controlled Groundwater Areas have been created in response to issues with water quantity and water quality within a specific geography (§ 85-2-506, MCA). In order to create a Controlled Groundwater Area the DNRC must be in receipt of a "*PETITION FOR CONTROLLED GROUNDWATER AREA*", (Form 630). This form may be filed by a state or local public health agency for identified public health risks; a municipality, county, conservation district, or local water quality district formed under Title 7, chapter 13, part 45; or by at least one third of the water right holders in an area proposed for designation of a Controlled Groundwater Area. The petition for the creation of a Controlled Groundwater Area must contain an analysis by a hydrogeologist, qualified scientist, or qualified licensed engineer concluding that one or more of the following criteria are met:

- Current or projected reductions of recharge will cause groundwater levels to decline to the extent that current water users cannot reasonably exercise their rights.
- Current or projected withdrawals have reduced or will reduce groundwater levels or surface water availability necessary for current users to reasonably exercise their rights.
- Current or projected withdrawals have induced or altered or will induce or alter contaminant migration exceeding relevant water quality
- Current or projected withdrawals have impaired or will impair groundwater quality necessary for current water right holders to reasonably exercise their rights.
- Groundwater within the proposed area is not suited for beneficial use
- Public health, safety, or welfare is or will become at risk.

Upon receipt of an application the DNRC has 180 days in which to notify the petitioner of any defects or the petition will be treated as Correct & Complete. If deficiencies are identified the petitioner will then have 90 days to correct these deficiencies before the petition is terminated. Once the petition has been determined to be Correct & Complete the DNRC will have 60 days in which to initiate rulemaking proceedings including public notice, deny the petition in whole or in part with a sufficient explanation, or inform the petitioner that the DNRC will require an additional 90 days in which to come to a final decision. If there is not enough information to conclude that a permanent Controlled Groundwater Area is necessary the DNRC may designate a temporary Controlled Groundwater Area during which ongoing measurements will be utilized to determine if a permanent status is warranted.

Links:

Controlled Groundwater Areas
§ 85-2-506, MCA
Form 630 – Controlled Groundwater Area Petition

Controlled Groundwater Areas & Basin Closures by Regional Office

Every employee should become familiar with the various closures that exist within the geography served by their office. The following is a list of the individual Basin Closures and Controlled Groundwater Areas broken down by regional office. Exceptions to each closure exist. These are discussed regionally and can also be found in "Montana's Basin Closures and Controlled Groundwater Areas" located under "References" on the New Appropriations Web Site.

Billings Regional Office

- Controlled Groundwater Area
  - Powder River Basin
  - Horse Creek
  - South Pine
  - Lockwood
- Administrative Rule Closure
  - Rock Creek
  - Musselshell River
- Compact Closure
  - Northern Cheyenne
  - Crow
  - Little Bighorn Battlefield
  - Big Horn Canyon National Recreation Area

Glasgow Regional Office

- Controlled Groundwater Area
  - South Pine
- Administrative Rule Closure
  - Musselshell River
  - Milk River Closure
- Compact Closure
  - Fort Belknap
  - Black Coulee Wildlife Refuge
  - Charles M. Russel National Wildlife Refuge

- Bowdoin National Wildlife Refuge

Havre Regional Office

- Administrative Rule Closure
  - Milk River Closure
- Legislative Closure
  - Teton Basin
  - Upper Missouri Basin
- Compact Closure
  - Glacier National Park
  - Fort Belknap
  - Black Coulee Wildlife Refuge
  - Chippewa Cree of the Rock Boy
  - Benton Lake Wildlife Refuge
  - Blackfeet

Lewistown Regional Office

- Administrative Rule Closure
  - Musselshell River
- Legislative Closure
  - Upper Missouri River Basin
- Compact Closure
  - Benton Lake Wildlife Refuge
  - Charles M. Russell National Wildlife Refuge

Kalispell Regional Office

- Controlled Groundwater Area
  - BNSF Paradise Railyard
  - BNSF Somers Railyard
  - BNSF Somers Expansion
- Administrative Rule Closure
  - Walker Creek
  - Truman Creek
- Supreme Court Closure
  - Flathead Reservation
- Compact Closure
  - Glacier National Park

Missoula Regional Office

- Controlled Groundwater Area
  - Bitterroot Valley Sanitary Landfill
  - Hayes Creek Basin
  - Larson Creek
- Administrative Rule Closure
  - Sixmile Creek
  - Houle Creek
  - Grant Creek
  - Sharrott Creek
  - Willow Creek

- Supreme Court Closure
    - Flathead Reservation
- Legislative Closure
    - Upper Clark Fork Basin
    - Bitterroot Basin

Helena Regional Office

- Controlled Groundwater Area
    - Butte Alluvial and Bedrock Site
    - Old Butte Landfill/Clark Tailings
    - Warm Springs Ponds
    - East Valley (Helena)
- Administrative Rule Closure
    - Towhead Gulch
- Legislative Closure
    - Upper Missouri Basin
    - Upper Clark Fork Basin
    - Jefferson and Madison Basins
- Compact Closure
    - Big Hole Battlefield
    - Red Rock Lakes National Wildlife Refuge

Bozeman Regional Office

- Controlled Groundwater Area
    - USNPS Montana Compact Yellowstone
    - Bozeman Solvent Site
    - Idaho Pole Company Site
- Legislative Closure
    - Upper Missouri Basin
    - Jefferson & Madison Basins
- Compact Closure
    - Yellowstone National Park
    - Red Rock Lakes National Wildlife Refuge

Bozeman Solvent Site Controlled Groundwater Area

- Created based on water quality concerns (dry cleaning solvent) through petition process
- No exceptions to permitting, so have to mitigate any new uses (initially did break out two different types of permits based on level of use, but not in a way that can allow exemptions from mitigation in closed basin)
- Replacement wells are acceptable, but have to be through 606 Replacement Well process
    - Upon receipt of 606, DNRC can issue permit to drill – required for the driller for any beneficial use. DEQ will ensure well is sampled.
- Dewatering wells do not need to go through DNRC
- Most of BSSCGA is within city water supply zone, except north of the East Gallatin River
- Treatment with microbes has been implemented and most levels in the upper level are all below treatment level now

Idaho Pole Controlled Groundwater Area

- Created based on water quality concerns (wood pole treatment) through petition process
- Very small area of effect with low building potential
- (Assuming similar to BSS, where no new permits allowed in closed basin without mitigation)
- Pump and treat system in place
- No beneficial uses allowed at all except for remedial actions
- Conversation has taken place on shrinking the defined area (getting rid of south end, as based on property boundary and not actual contamination)

NPS Compact

- Bozeman Regional Office Manager is the liaison/expert for the NPS/MT Compact, generally contact with any questions, both internal questions and questions for the NPS Compact Liaison.

Compact areas of effect: Surface waters and potentially hydrologically-connected groundwaters upflow, in, and adjacent to the following NPS Areas, as delineated by the Compact – Glacier National Park (GNP), Yellowstone National Park (YNP), Big Hole National Battlefield (BHNB), Bighorn Canyon National Recreation Area (BCNRA), Little Bighorn Battlefield National Monument (LBBNM). Grant Kohrs Ranch National historical Site (GKRNHS) and Nez Perce National Park (NPNP) do not include reserved land – these waters not regulated by Compact.

Yellowstone Controlled Groundwater Area – separate provision of the Compact, not related to YNP surface water portion of compact, mentioned above, though in some areas both YNP Compact and YCGA can apply.

- Created to protect the hydrothermal resource of Yellowstone National Park through the National Park Service water rights compact
- Water temperature (less than 60 degrees F) and specific conductance are the two parameters requested to ensure that not drawing upon hydrothermal water connected to the park
    - Appropriations of water between 60 degrees F and 85 degrees F are possible, depending upon the specific conductance value and geothermal gradient
    - Attempts to appropriate water greater than 85 degrees F have a high burden and can only be considered in discharge areas (map breaks out recharge versus discharge areas to the YNP hydrothermal system – though these are not well-defined scientifically)
- Has built in exemption to full permitting process for uses under 35 GPM and 10 AF/YR that can be used in closed basins today
    - Requires notice to NPS on all applications. NPS can object based on hydrological connection to surface water source regulated by the NPS compact (generally sources in, bordering, and up flow of YNP).
    - Permits for non-exempted amounts are required to analyze net depletions to surface waters regulated by the compact, if applicable
- ARM Link: http://www.mtrules.org/gateway/Subchapterhome.asp?scn=36%2E12.12
- MCA Link: https://leg.mt.gov/bills/mca/title_0850/chapter_0200/part_0040/section_0010/0850-0200-0040-0010.html

Federal Reserved Water Rights

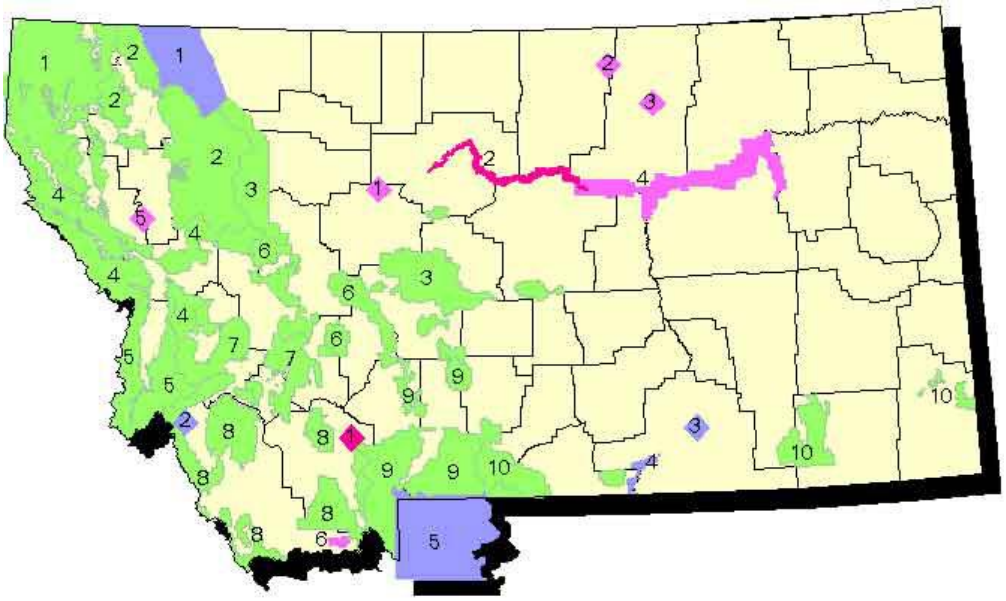
FOUR IMPORTANT BASIC POINTS

- Water Rights are established by state law, with the exception of Federal Reserved Water Rights.

- Federal Reserved Water Rights are rights appurtenant to Federal and Indian lands. They were recognized by the U.S. Supreme Court in Winters v. United States in 1908. Courts have held that there is an implied water right to satisfy the primary purposes of the reservation.
- These rights are indefinite and wide ranging. For ease of administration and quantification, the State of Montana negotiates "compacts" with Federal Agencies and Indian Tribes (other states rely on the attorney generals to litigate Federal Reserved Water Rights.
- A compact defines the limits of reserved water rights and in return the state of Montana formally recognizes some claimed rights and uses.

Federal Lands in Montana with Reserved Water Right Claims

Reserved water rights are claimed for these lands in Montana by the following federal agencies:



- U.S. Forest Service, Department of Agriculture (green)
- National Park Service, Department of Interior (purple)
- Bureau of Land Management, Department of Interior (red)
- U.S. Fish and Wildlife Service, Department of Interior (pink)

In Montana, federal reserved water rights have been claimed for seven Indian reservations, for allotments for the Turtle Mountain Chippewa Tribe, and for federal lands within the State (national parks, forests, national wildlife refuges, and federally designated wild and scenic rivers). *A water rights compact is a contract or agreement between the State of Montana and a Federal Agency or tribe settling and enumerating these reserved claims.* This settlement typically quantifies the amount of water claimed and may include logistic and operational parameters for the water in the claimed area.

Think of a compact as negotiated settlement agreement. The Compact, or agreement, is between the tribe or agency and the State of Montana (acting as the owner of all unreserved state waters). The tribe or agency is alleging that they have water right claims inherent in their ownership or historical occupancy of certain lands. The compact settles these rights as though they had gone through the statewide adjudication process (a process from which they were statutorily exempt).

A federal reserved water right differs from the state appropriative water rights familiar to most members of the public. Under Montana water law, which incorporates the prior appropriation doctrine (first in time, first in right), the right to water depends on the priority of a person's claim. The water user is limited to appropriating only that amount that can be put to beneficial use at a specific time. If the state right is not used over a certain period of time it can be lost by abandonment. Since the passage of the Montana Water Use Act in 1973, the state has been working on an adjudication process to finalize all water rights prior to that date in state Water Court. For those wishing to obtain post-1973 water rights, the law established a permit system administered by the State Department of Natural Resources and Conservation (DNRC).

Federal reserved water rights were created when the United States Supreme Court made the Winters v. United States (206 U.S. 564 [1908]) decision about a Fort Belknap Indian Reservation water claim. In the Winters decision, the Supreme Court held that when Congress or the President sets aside land out of the public domain for a specific federal purpose, such as an Indian reservation, National Park, or a National Forest, a quantity of water is reserved which is necessary to fulfill that specific federal purpose. A federal reserved water right has a priority date as of the date the land was withdrawn, and the reservation was created. The rights cannot be lost through non-use.

Quantification, or the determination of the size of a federal reserved water right for the state adjudication process, requires the Montana Reserved Water Rights Compact Commission (RWRCC) to reach an understanding with the federal agency holding the water right about the purpose for which the specific federal reserve was created. The parties must then come to agreement as to how much water is necessary to satisfy the purpose of the reserve. The resulting agreement must be signed by the negotiating parties, the appropriate federal officials, pass through the Montana legislature, (and the U.S. Congress, in some cases) and go to the Water Court for incorporation into a final decree for the specific water basins involved.

Compacts by WRD Regional Office

Billings: Northern Cheyenne Indian Reservation, National Park Service, Crow Indian Reservation, USDA Fort Keogh Livestock and Range Research Station, USFS Compact

Bozeman: U.S. Bureau of Land Management (BLM), National Park Service, USFS Compact

Glasgow: U.S. Bureau of Land Management (BLM), Fort Peck Indian Reservation, Bowdoin National Wildlife Refuge, Charles M. Russell National Wildlife Refuge Upper Missouri River Breaks National Monument

Havre: Blackfeet Tribe Compact, Rocky Boys Indian Reservation, U.S. Bureau of Land Management (BLM), U.S. Fish and Wildlife Service (USFWS), National Park Service, Fort Belknap Indian Reservation , Charles M. Russell National Wildlife Refuge, USFS Compact

Lewistown: Charles M. Russell National Wildlife Refuge Upper Missouri River Breaks National Monument, USFS Compact

Helena: Red Rocks Lakes NWR, National Park Service, USDA Sheep Experiment Station, USFS Compact

Kalispell: National Bison Range Compact, National Park Service, USFS Compact

Lewistown: U.S. Bureau of Land Management (BLM), U.S. Fish and Wildlife Service (USFWS) Upper Missouri River Breaks National Monument, USFS Compact

Missoula: USFS Compact

Blackfeet Tribe Compact 85-20-1501 MCA

After 20 years of negotiations, a compact settlement between the Blackfeet Tribe, the United States and the Commission passed the legislature in 2009. The compact will provide water and economic development for the Blackfeet while protecting the rights of water users locally and downstream on the Milk River. The compact was introduced in Congress in 2010. The federal bill can be found on: The Thomas Library of Congress website by typing in the bill number S.434.

National Bison Range Compact 85-20-1601 MCA

A compact between the State and the U.S. Fish and Wildlife Service for the National Bison Range Wildlife Refuge was reached in 2009. The compact was ratified by the 2009 Montana Legislature and signed by the Governor. The Montana Water Court issued the Bison Range preliminary decree in September 2011 (Case # WC-2011-01).

Rocky Boys Indian Reservation 85-20-601 MCA

A water rights compact between the State and the Chippewa Cree Tribe of Rocky Boy's Indian Reservation was reached in early 1997. The compact was ratified by the 1997 Montana Legislature and was signed by Governor Marc Racicot in 1997. The compact was approved by the U.S. Congress in 1999. The Montana Water Court issued a final decree for the compact in June 2002 (Case # WC-2000-01).

U.S. Bureau of Land Management (BLM) 85-20-501 MCA

A water rights compact with the Bureau of Land Management for both the Upper Missouri Wild and Scenic River and Bear Trap Canyon Public Recreation Site on the Madison River was ratified by the Montana Legislature and was signed by the Governor in 1997. It does not require ratification by Congress. In May 2011, the Montana Water Court issued a final decree for the BLM-Montana Compact (Case # WC-2008-10).

U.S. Fish and Wildlife Service (USFWS) 85-20-701 MCA

In 1996, a water rights compact between the State and the USFWS was reached for both the Benton Lake and Black Coulee National Wildlife Refuges (NWR). The Compact was ratified by the 1997 Montana Legislature and was signed by Governor Marc Racicot. The compact have been approved by the Federal agencies. Ratification by Congress is not required. The Montana Water Court issued final decrees for the compact in October 2005 (Case # WC-2000-03 & WC-2002-04).

Red Rocks Lakes NWR 85-20-801 MCA

A water rights compact for Red Rocks Lakes NWR was ratified by the Montana Legislature and signed by the Governor in 1999. The compact has gone through the federal approval process and the Montana Water Court

issued a final decree on this compact in August 2005 (Case # WC-2000-02). Ratification by Congress is not required.

Northern Cheyenne Indian Reservation 85-20-301 MCA

Negotiations between the Commission and the Northern Cheyenne Tribe were successfully concluded in 1991 and the compact approved by the Montana Legislature and signed by the Governor. The Northern Cheyenne Compact was ratified by Congress and signed into law in September 1992. The Montana Water Court issued a final decree for this compact in August 1995 (Case # WC-93-1).

National Park Service 85-20-401 MCA

A water rights compact with the National Park Service for Yellowstone and Glacier Parks, and the Big Hole Battlefield was finalized in 1993. The 1995 Legislature ratified a compact for the remaining two Park Service units: Little Bighorn Battlefield National Monument and Bighorn Canyon National Recreation Area, completing Park Service negotiations in Montana. The compact does not require congressional approval. The Montana Water Court issued a final decree for this compact in April 2005 (Case # WC-94-1)

Fort Peck Indian Reservation 85-20-201 MCA

Negotiations between the Commission and the Assiniboine and Sioux Tribes of the Ft. Peck Indian Reservation were successfully concluded in 1985. The compact was ratified by the 1985 Montana Legislature and signed by the Governor. The Fort Peck compact was approved by appropriate Federal agencies. Congressional approval has not been granted. The Montana Water Court issued a final decree for this compact in August 2001 (Case #WC-92-1).

Crow Indian Reservation 85-20-901 MCA

A compact between the Crow Tribe, the United States and the State passed the Montana Legislature and was signed by the Governor in 1999. The compact was ratified by the United States Congress in November 2010. The settlement package was approved by the Crow Tribe in a referendum election in March 2011. The Montana Water Court issued a preliminary decree for this compact in January 2013 (Case No. WC-2012-06).

Fort Belknap Indian Reservation 85-20-1001 MCA

A compact between the State and the Gros Ventre and Assiniboine tribes of the Fort Belknap Indian Reservation was ratified by the 2001 Montana State Legislature and signed by Governor Judy Martz. Negotiations continue on a federal bill which must be approved by Congress. A bill was introduced in Congress in 2011 but no action was taken.

USDA Fort Keogh Livestock and Range Research Station 85-20-1101 MCA

A water rights compact for USDA Fort Keogh Research Station was approved by the Montana Legislature and signed by the Governor in 2007. The compact settles the administrative, irrigation, stock and emergency fire suppression water rights for Fort Keogh near Miles City. It includes reserved rights to Fort Keogh's current irrigation use from the Yellowstone River and some future irrigation use, and it includes a small amount of current use from a tributary of the Tongue River. The compact was approved by the Federal agencies in 2013. Water Court action is pending.

USDA Sheep Experiment Station 85-20-1201 MCA

A water rights compact for USDA Sheep Experiment Station was approved by the Montana Legislature and signed by the Governor in 2007. The Compact settles the stock water, domestic, irrigation, storage, dust abatement, reclamation, research, emergency fire suppression and other water rights of the small portion of the Sheep Experiment Station located in Montana. The compact was approved by the Federal agencies in 2013. Water Court action is pending.

Bowdoin National Wildlife Refuge 5-20-1301 MCA

This compact settles the reserved water rights for uses including administrative, wildlife habitat maintenance and enhancement, stock watering and other. The FWS water rights are contingent on an MOU which must be attached to the compact as Appendix 3. The MOU includes provisions relating to the solution of the severe salinity problems on the Refuge. The MOU was approved by all Parties in April 2013. The compact awaits Federal agency approval and Water Court action is pending.

USDA Forest Service 85-20-1401 MCA

The water compact between the State of Montana and the U.S. Forest Service, which took more than 15 years to negotiate, was approved by the Montana Legislature and signed by the Governor in 2007, followed by Federal agency approval. The compact recognizes reserved water rights for the Forest Service for administrative and emergency firefighting, and for instream flows for the South Fork Flathead Wild and Scenic River. The compact uses state law to create state-based water rights for instream flow on the National Forest System lands. The Montana Water Court issued a final decree for this compact in October 2012 (Case # WC-2007-03).

Note – The US Forest Service Compact is unique in that it provides a process for the Forest Service to turn reserved water rights into state water reservations. Essentially, these are statements of claim for instream flow. The Forest Service Compact lists protected instream flows on approximately 85 rivers and streams in Montana. However, the task of enumerating flows on thousands of tributaries and other rivers exceeded the resources of either the Forest Service or the State, so the compact gives the Forest Service 30 years from the time of the Compact to identify additional instream rights.

These Forest Service unidentified rights are misleadingly called "reservations." They are reservations in that they are the product of Forest Service reserved water rights. They have nothing to do with typical state-based reservations found in Mont. Code Ann. 85-2-316

U.S. Forest Service Lands in Montana with Reserved Water Right Claims:

- Kootenai National Forest
- Flathead National Forest
- Lewis and Clark National Forest
- Lolo National Forest
- Bitterroot National Forest
- Helena National Forest
- Deer Lodge National Forest
- Beaverhead National Forest
- Gallatin National Forest
- Custer National Forest

These claims are primarily instream flow claims which are listed by drainage at MCA 85-20-1401. (TABLE 1)

Charles M. Russell National Wildlife Refuge

The United States and the State of Montana have agreed to the terms of a compact settling for all time the United States' federal reserved water rights claims for the Charles M. Russell National Wildlife Refuge (CMR). The final compact is the product of a year of settlement negotiations between the United States Department of Interior and the Montana Reserved Water Rights Compact Commission. The negotiated compact was ratified by the 2013 Montana Legislature and signed by the Governor. In the coming months, the compact will be signed by the Secretary of the Interior and submitted to the Montana Water Court for incorporation into a final decree. The ratified compact subordinates the United States' 1936 priority date to 2013, quantifies a federal reserved water right consisting of baseflows in sixty-nine streams draining onto the refuge, and implements limitations on larger on-stream impoundments on selected streams. Ratified Compact

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Upper Missouri River Breaks National Monument

The United States and the State of Montana have agreed to the terms of a compact settling for all time the United States' federal reserved water rights claims for the Upper Missouri River Breaks National Monument. The final compact is the product of a year of settlement negotiations between the United States Department of Interior and the Montana Reserved Water Rights Compact Commission. The negotiated compact was ratified by the 2013 Montana Legislature and signed by the Governor. In the coming months, the compact will be signed by the Secretary of the Interior and submitted to the Montana Water Court for incorporation into a final decree. The ratified compact subordinates the United States' 2001 priority date to June 1, 2012, quantifies a federal reserved water right of 160 CFS and 5 CFS in the Judith River and Arrow Creek respectively, institutes an on-stream impoundment limitation, and requires ramping of large new diversions. Ratified Compact

Deficiency Letters, Correct & Complete, & Technical Reports

Review for Deficiencies

The deficiency letter is the document that outlines how the application does not meet the correct and complete standard set by ARM 36.12.1601.

Because of the importance of the deficiency letter it is necessary to compare the application with the Administrative Rules line by line and identifying every instance where the application does not fully meet the Administrative Rules standard for correct and complete. It is vital to remember that it is totally possible and expected that there will be correct and complete applications which later lead to a decision to deny. The purpose of a deficiency letter IS NOT to ask questions that will lead the Applicant to a decision to grant. The purpose is to identify rule-based deficiencies for which the application can be terminated if adequate response is not received. There are numerous opportunities to communicate concerns you have with their application in the context of whether the information will lead to a grant or a denial. The deficiency letter is not one of those times.

Relevant Statutes and Rules

36.12.1501 PERMIT AND CHANGE APPLICATION DEFICIENCY LETTER AND TERMINATION

36.12.1601 WATER RIGHT PERMIT AND CHANGE - CORRECT AND COMPLETE DETERMINATION

Deficiency Letters

Whenever an application cannot be deemed correct and complete due to a lack of information, a deficiency letter should be crafted and sent to the Applicant. Correct and complete simply means that all required information is present in a form that is substantial and credible in nature. The deficiency letter should identify any shortcoming in the application that do not meet the correct and complete standards of ARM 36.12.1601. Each deficiency should be clearly identified in the deficiency letter with as much information needed to explain what the Applicant must provide or address for their application to be considered correct and complete. Each deficiency identified needs to include a citation of the administrative rule not met. Deficiency letters should have nothing to do with addressing statutory criteria. Deficiency letters are only related to the application elements required by ARM being substantially and credibly addressed. Only 1 deficiency letter should be sent so it is important to thoroughly review an application for deficiencies. If the information returned in response to the deficiency letter is inadequate, the application shall be terminated. Please note, however, that you can contact the Applicant or consultant via phone or email and request clarifying information during processing of the application.

A deficiency letter should be written on the Department letterhead of the office where the application is being processed. It should be written in standard letter format that clearly identifies the date sent, the Applicant and the application number. The bottom of the letter should identify the specialist preparing the letter with an address, phone number and email where the specialist can be contacted. A template of a standard deficiency letter is available on the ROCO drive.

The requirements and time lines for a deficiency letter are described in ARM 36.12.1501. A deficiency letter identifying all defects of the application must be sent within 180 days of the receipt of the application. If the Department does not notify the applicant of any defects within 180 days, the application must be treated as a correct and complete application.

Note: When preparing the letter do not use an automatically updating date field. It may be necessary to review, re-print or to send the letter via email to someone else later. An automatic updating date field will cause confusion the next time the document is opened.

The deficiency letter must end with the approved important information text at the bottom of the letter that describes the statutory time requirements for response and consequences if those time lines are not met.

IMPORTANT INFORMATION: If all of the requested information in the deficiency letter is postmarked and submitted to the Department within 30 days of the date of the deficiency letter or an extension of time of no more than 15 days, the priority date on a permit application will not be changed, or for change applications, the date received will not be changed. A request for extension of time must be submitted in writing. If all of the requested information in the deficiency letter is postmarked or submitted within 31 to 90 days of the date of the deficiency letter unless extended, the permit application priority date will be changed to the date when the Department

receives all of the requested information, or for a change application, the date received will be changed. If all of the requested information in the deficiency letter is not postmarked or submitted within 90 days of the date of the deficiency letter, the permit or change application will be terminated and the application fee will not be refunded.

***For all permit and change applications received on/after October 1, 2019, the deficiency response timeline statutorily changed to 120 days. For all deficiency letters sent for applications received on/after October 1, 2019, use the following language at the bottom of the deficiency letter:

IMPORTANT INFORMATION: If all of the requested information in the deficiency letter is not postmarked or submitted within 120 days of the date of the deficiency letter, the application will be terminated, and the fee will not be refunded.

Correct & Complete

Administrative Rules of Montana (ARM) 36.12.1601 addresses the "Correct & Complete" determination of permit and change applications.

- Once an application is received; the Department will review it to ensure that all information required per rule that is necessary to address the statutory criteria has been submitted. This is also known as a "Correct & Complete" determination. The Department cannot move forward on an application to analysis of the application for statutory criteria until it has been deemed "Correct & Complete."
- It is important to understand that providing information required for a "Correct & Complete" determination is not necessarily the same as proving the statutory criteria. The Department can only grant an application if the criteria for issuance of a permit or change application are proven.

Application for Beneficial Water Use Permit (Forms 600-SW and 600-GW)

A. For ***permit applications***, information required under the following ARM rules must be submitted and meet the standard of substantial credible information in order to receive a "Correct & Complete" determination:

- 36.12.110- Legal land description standards
- 36.12.111- Map standards
- 36.12.112- Period of diversion and period of use standards
- 36.12.113- Reservoir standards
- 36.12.114- Source name standards
- 36.12.115- Water Use standards
- 36.12.116- Evaporation standards*
- 36.12.120- Basin closure area exceptions and compliance
- 36.12.121- Aquifer testing requirements
- 36.12.1301- Permit and change application acceptance
- 36.12.1401- Permit and change application modification
- 36.12.1701- Filing a permit application
- 36.12.1702- Permit application criterion: physical surface water availability*

- 36.12.1703- Permit application criterion: physical groundwater availability*
- 36.12.1704- Permit application criterion: existing legal demands*
- 36.12.1705- Permit application criterion: comparison of physical water availability and legal demands*
- 36.12.1706- Permit application criterion: adverse effect
- 36.12.1707- Permit application criterion: adequate diversion means and operation
- 36.12.1802- Permit and change applications: possessory interest

*For permit applications, the Department will complete an analysis to determine physical availability of water and existing legal demands. The Department will also calculate evaporation in reservoirs if no calculations are provided within the application materials. The Department's findings will be presented in a technical report once the application has been deemed "Correct & Complete." The Applicant can provide the Department with substantial and credible evidence they have collected which addresses physical or legal availability of water. The Department will take into account any additional information provided by the Applicant when analyzing physical and legal availability of water. The burden of proof for issuance of a permit in regards to physical and legal availability of water still rests with the Applicant.

B. The Department will examine applications to determine if all information required under the above ARM rules (see section A.) pertinent to the application has been provided. If required information is missing, a deficiency letter will be sent to the Applicant identifying the missing information.

C. There may be additional addenda required to be submitted which will supplement the information requested on Form 600-GW or 600-SW. The Department will not be able to make a "Correct & Complete" determination unless the additional addenda are completed with all required information.

Application addenda that may be required:

- **Application Form 600-SW**
  - Basin closure addendum
  - Storage addendum
  - Water marketing addendum
  - Criteria addendum for appropriations greater than 5.5 CFS and 4,000 acre-feet

- **Application Form 600-GW**
  - Aquifer testing addendum
  - Basin closure addendum
  - Hydrogeologic report addendum
  - Yellowstone controlled groundwater area addendum
    - Wells under 35 GPM
    - Wells over 35 GPM
  - Storage addendum
  - Water marketing addendum
  - Criteria addendum for appropriations greater than 5.5 CFS and 4,000 acre-feet

D. Common deficiencies with permit applications

- Required addenda are missing or not completed with all requested information

- Supplemental explanations are not given when requested
- If a representative of the Applicant signs the application, they must provide documentation establishing their authority to sign the application
- No pump information with a pump curve is submitted
- Application materials are lacking sufficient information on headgate/ditch capacity
- Inadequate description provided for how the diversion system will be operated from the point of diversion through the place of use
- Lacking explanation of why the requested flow rate/volume is required for beneficial use for applications which don't use DNRC standards

"Correct & Complete" Letter

Once an application has been deemed "Correct & Complete," a letter will be sent out informing the Applicant. A technical report will accompany the "Correct & Complete" letter. Once this occurs, the Department has 120 days in which to draft a preliminary determination document. If the Applicant would like to discuss any information presented within the Technical Report, they have 15 days from the date of the "Correct & Complete" letter to contact the DNRC and request a meeting. If the Technical Report findings are different than information presented with the application, the Department will proceed with the findings of the Technical Report and consider the application to be amended unless a meeting is requested within 15 days of the date of the "Correct & Complete" letter to resolve the differences. If the application is amended by the Technical Report and the Department proposes to grant the application, the Applicant will not be able to request a hearing on the lesser amounts found by DNRC in the technical report. If a meeting is requested, be sure to document all individuals attending and the topics discussed. If the Applicant chooses not to dispute the Department's findings, be sure to document this as well. If the Applicant does dispute the Department's findings, they can request up to 60 days of additional time to provide information to the Department for review. If any additional time is requested to provide more information, the Applicant must submit a waiver of timelines form with that request. This is necessary to give the Department adequate time to review the additional information and complete the PDD taking into account the new information. The waiver of timelines form must be signed by the Applicant or their Attorney if they are being represented by legal counsel. The Applicant may waive timelines at any point in the process once an application has been deemed Correct & Complete. An Applicant cannot waive any timelines prior to a Correct & Complete determination of the application. A waiver of timelines waives the 120-day statutory timeline set for the Department in issuing a decision on a permit. If an Applicant waives timelines on an application, staff processing the application should make every effort to complete review and draft a decision document in a timely fashion. If, upon review of this additional information, the Department's findings still do not agree with the Applicant, the Department will proceed with either a grant with modifications or decision to deny, depending on the specifics of the application. If no meeting is requested, begin the process of a Draft Preliminary Determination Decision which will grant, deny, or grant with modifications the water right application.

Technical Reports

Overview:

Technical Reports are always completed for permits. There are no special circumstances where you do not have to complete a Technical Report for permit applications.

The Technical Report stems from the need for Applicants to have an opportunity to see what data the DNRC will be utilizing in our decisions PRIOR to our making a decision. The Technical Report (including the Stream Depletion Report & Aquifer Test Report) should only be sent to an Applicant at correct and complete. Don't forget that when the Department grants an application there is not a draft decision sent out, so the Technical Report is even more vital as it singularly establishes reference information for the Applicant to consider prior to the Department formulating a decision.

The Technical Report IS: A collection of facts that the DNRC has gathered independent of what the Applicant provided in the application. Basically, the Technical Report details what information the Department would utilize in formulating a decision document at that point in time. No more and no less.

The Technical Report IS NOT: An analysis or discussion of whether the application meets the criteria. As such you should not highlight or make bold elements of the Technical Report which in your mind might later cause the application not to be granted. There are numerous opportunities to communicate concerns you have with applications in the context of whether the information will lead to a grant or a denial. The Technical Report is not one of those times.

The Details:

The following guidance should provide you with the tools and information necessary to create an effective Technical Report.

There are template Technical Report Word documents located on the ROCO drive which should be utilized when you begin crafting your Technical Reports. Example Technical Reports are located in that same location.

The Technical Report will address all the data and information the DNRC has collected, independent of what was provided in the application materials. The Report will explicitly detail what information we will be using to analyze each of the criterion identified. The Technical Report should in no way address whether the application meets statutory criteria. The Technical Report only addresses the elements and data that the Department will be basing our analysis of the criteria on outside of what the Applicant supplied.

The Technical Report will state exactly what data or method will be used to analyze if water is physically available up to and including breaking down month by month how much water appears to be present in a given source. The DNRC **will not** take that information to the next step and relate the data into the realm of criterion analysis. We will be saying this is how we are going to be looking at physical availability and when the Applicant receives the Technical Report at correct and complete they can make the determination relating to what they need to do based on the information we provide to them which shows what our criteria related analysis will be based on.

The Technical Report is not and should not be considered a duplication of effort in relation to our crafting a PD. The information contained in the Technical Report that the Department is relying on for the decision should be included in your PD as findings of fact. All you should have to do is copy the elements contained in Technical Report into the relevant criterion related sections of the PD and add a sentence or two which explains what the DNRC is finding and if the information in that finding shows by a preponderance of the evidence that the

specific criterion is being meet. Anyone who reads the Technical Report should be able to reproduce the calculations made by the Department.

If the Department's calculations in the technical report are less than what the Applicant has proposed, the application will proceed as a "grant" not a "grant in modified form" if the Applicant does not dispute the calculation in the technical report. This will also be treated like an amendment to the application. The correct and complete template letter has optional text to include this procedural clarification, be sure to include that language.

When does the Technical Report go out?

The Technical Report along with the Stream Depletion Report and Aquifer Test Report should only be sent to Applicants after an application has been deemed correct and complete. A second Technical Report or revised Technical Report can be sent if additional details are provided to the Department, or corrections are made to the initial Technical Report which will influence what the Department reviews during the criteria analysis.

After the Technical Report is sent out at correct & complete, the Department may communicate with Applicants as needed. These communications can be done orally or in writing and are separate from the correct and complete letter (and determination) and the Technical Report.

Who is responsible for the creation of the Technical Report?

The regional office processing the application is responsible for drafting the Technical Report. It is the responsibility of the individual regional managers to understand what level of analysis and data compilation their staff is capable of. The Technical Report is not necessarily a one person show. It is imperative that lines of communication remain open between regional offices, the Central Office and the Water Management Bureau (relating to technical hydrologic guidance). Remember the Water Management Bureau (WMB) does not process water right applications; they simply analyze certain technical aspects of applications, provide peer review and teaching to regional offices, & in general serve as our guides in all matters hydrologic. Regional office staff are responsible for initially reviewing applications to such a level that they can convey to the WMB any out of the ordinary numbers or considerations they would like them to look at and consider prior to completing their technical analysis.

The Central Office is available to answer your questions pertaining to what should and what should not be included in Technical Reports.

The Technical Report for Permit Applications:

A Technical Report for new appropriation permit applications will contain at a minimum the following information:

- **Physical availability of water**
  - During the pre-application meeting, elements relating to physical availability need to be discussed, including: The source of water, a discussion of why the water is available, if appropriate whether measurements or aquifer tests need to be completed and a discussion of what source measurements or aquifer tests may need to be completed.
  - For surface water applications, what gage and dataset will be used and how does it break down the physical availability of water in the source (median of the mean) by month. This is just the data, not a conclusion of if the data shows that water is physically available in the context of the application.

- For surface water if there is not a proper gage then what measurements and models will be used and how much water does this technique show is available over the proposed period of diversion? It may be necessary for the regional managers and hydro specialists to work with the Water Management Bureau as necessary in order to put appropriate data into this report. This is just the data, not a conclusion of if the data shows that water is physically available in the context of the application. With regard to measurements that may be necessary in an ungaged situation the Applicant will complete the measurements. The DNRC is not required by rule to make these measurements. This should have been discussed during the pre-application meeting as well.
- All groundwater applications will be sent to the WMB for review. WMB staff will complete an Aquifer Test Report and Stream Depletion Report which need to be included with the Technical Report as appendices. As a reminder, the Applicant must follow specific aquifer testing requirements and provide at a minimum information and data in conformance with ARM 36.12.121 to the DNRC. The requirements of ARM 36.12.121 must be followed unless a variance has been granted by the DNRC. Questions relating to the specifics of the aquifer testing requirements outlined in ARM 36.12.121 or relating to the appropriateness of a variance should be directed to the appropriate staff in the WMB.

- **Legal availability of water**
  - During the pre-application meeting, elements relating to legal availability will be discussed. Specifically, the Applicant will discuss why they think water is available. This information should be contemplated along with your specialized and localized knowledge as you decide what area and rights will be incorporated into the legal availability section of the Technical Report and later in the legal availability criterion analysis itself.
  - The Technical Report should include an explanation of what water rights will be looked at with regard to legal availability and also a breakdown by month of how much water is already legally accounted for in the area of potential impact you previously determined
  - For groundwater applications, the Technical Report will also include any net depletion to surface water including what amount and in what reaches as determined by the WMB. This will be included as an appendix.
- **Adverse effect**
  - State the figures and reference the WMB appendices that determine the figures that will be used for this criterion.
  - Include a list of all water rights which are being considered for adverse effect by the proposed appropriation. Include this list in the Technical Report or as an Appendix to the Technical Report.
  - Display a comparison of physical availability and legal demands.
- **Adequacy of diversion works**
  - Include any information that is gathered or known outside of the information submitted with the application.
- **Beneficial use**
  - Include any information that is gathered or known outside of the information submitted with the application.
- **Possessory interest**
  - Include any information that is gathered or known outside of the information submitted with the application.
  - If there is any question as to if there is proper authority to represent the application (possibly ownership of the entire POU) point out the information you discovered.

Physical Availability for Permit Applications

Overview:

Physical availability is an element (criterion) which must be analyzed in order to issue a permit under MCA 85-2-311 for both surface water and groundwater applications. To show that water is physically available in the source at the flow rate and volume that the Applicant seeks to appropriate, there are numerous variables and processes that must be considered. There needs to be a preponderance of evidence that water is physically available at the proposed point of diversion. In some instances, there are applications that are seeking a flow rate and volume greater than 5.5 CFS and volume 4,000 Acre-Feet (AF). The evidentiary requirement for these applications increases from a preponderance to clear and convincing.

For groundwater applications Applicants must follow aquifer testing requirements and provide the minimum information and data outlined in ARM 36.12.121 to the Department. When analyzing the information below please keep in mind that it is the MCA and ARM that should ultimately be acting as your guide when analyzing physical availability. Keep in mind that the goal of this process is to determine **how much water is physically available at the point of diversion (or in the source as close to the point of diversion as possible)**.

MCA: The following MCA provides the basis for why we analyze physical availability when permitting water rights.

§85-2-311 Criteria for issuance of permit

ARM: The following ARM provides us with guidance as to how we must analyze physical availability.

36.12.1702: PERMIT APPLICATION CRITERION - PHYSICAL SURFACE WATER AVAILABILITY

36.12.1703: PERMIT APPLICATION CRITERION - PHYSICAL GROUND WATER AVAILABILITY

Forms & Addenda: The following forms & addenda are directly related to physical availability.

- Form 600 SW (Surface Water Application for Beneficial Water Use Permit): Form 600 SW provides information relating to (but not limited to) the source of water being applied for including a map. Form 600 SW also requires an Applicant to identify if there is a gauging station on the source of water being applied for and if there is not there is a link to the appropriate measurement form and further instructions.
- Form 600 GW (Groundwater Application for Beneficial Water Use Permit):
- Form 600 ATA (Application for Beneficial Water Use Permit Aquifer Testing Addendum):
- Form 600 SA (Application For Beneficial Water Use Permit Addendum Reservoir/Place Of Storage):
- Form 649 (Discharge measurement form): This is a standardized Excel document which should be utilized to record surface water discharge measurements.

Resources:

- USGS Montana Water Science Center (Montana USGS stream-gaging and other related information)
- GWIC (Montana Groundwater Information Center; Well and other groundwater related information)

- GIS Software

Physical availability for surface water:

Memos:
Technical Memorandum: Estimation of Runoff Volumes for Ephemeral Drainages in Eastern Montana, dated October 7, 2019
Technical Memorandum: Physical Availability of Ponds, dated April 22, 2019
Technical Memorandum: Physical Availability of Surface Water Without Gage Data, dated April 18, 2019
Technical Memorandum: Physical Availability of Surface Water with Gage Data, dated November 1, 2019

Physical availability of surface water for permits should be calculated using the appropriate Technical Memorandum that applies to the specific situation in regard to the water source.

- If you have questions on methodology, evaluation technique to use, or would like an evaluation peer reviewed, contact WMB.
- In any unique circumstances which may involve deviation from a standard practice, please contact WMB to ensure that the proper methodology and analysis are being followed.

Physical Availability for groundwater applications:

Memos:
Technical Memorandum: Physical and Legal Availability of Ground Water, dated April 22, 2019
Legal availability of groundwater in the Flathead Deep Aquifer memo, dated March 13, 2018
Variance- Missoula Valley Geothermal/Heat Exchange Wells memo, dated March 10, 2010

In order to figure out if water is physically available for groundwater applications:

1. Once a groundwater permit application is received the technical analysis will be forwarded to the WMB for review.
2. The Applicant must follow specific aquifer testing requirements and provide at a minimum information and data in conformance with ARM 36.12.121 to the DNRC.
3. The requirements of ARM 36.12.121 must be followed unless a variance has been granted by the DNRC.
4. Questions relating to the specifics of the aquifer testing requirements outlined in ARM 36.12.121 or relating to the appropriateness of a variance should be directed to the appropriate staff in the WMB.
5. Ultimately the WMB will review the technical aspects of the groundwater permit application and complete and return an Aquifer Test Report and a Stream Depletion report. The technical aspects reviewed by WMB will follow the processes defined in the Numerical Groundwater Modeling Guidance Technical Memorandum, dated October 7, 2019, the Net Surface Water Depletion from Ground Water Pumping Technical Memorandum, dated July 6, 2018, and the Surface Water Depletion for Regional Bedrock Aquifers Technical Memorandum, dated September 16, 2019. The Aquifer Test Report will be utilized and referenced in your Preliminary Determination in relation to whether or not water is physically available for the proposed appropriation. The Stream Depletion Report will later be utilized to both aid in determining legal availability and adverse effect.

Specific Concepts and Q&A:

Specific information about aquifer tests

Testing at a constant rate at maximum flow rate demonstrates short term physical availability. Long term physical availability is typically addressed by extrapolating drawdown through the period of diversion, or through forward modeling using aquifer properties derived from aquifer test data (including well loss).

Variances can be approved by using existing tests (usually within ¼ mile), but this practice is not done on a regular basis. The Water Management Bureau can make recommendations regarding the granting of a variance, but it is the regional manager's responsibility to actually grant or deny the variance request. Also keep in mind that a variance does not omit the Applicant from proving the criterion.

ARM 36.12.121: Aquifer Testing Requirements. Is an observation well always required? Why or why not?

For interpretation of aquifer properties an observation well helps. Data from a pumping well may not reflect the full picture of the aquifer that the pump test is intended for. There are situations when a variance may be approved, usually due to economic factors (wells at great depth).

ARM 36.12.121: Aquifer Testing Requirements. Why do measurements have to be to a precision of 0.01 foot?

Most methods and measurement equipment have this precision so it's not unreasonable

ARM 36.12.121: Aquifer Testing Requirements: Why is there the requirement for the 24-hour test and a 72-hour test based on proposed flow rate?

The intention is to stress the aquifer to determine the effects of the development. Sometimes, the preferred testing methods do not give us the data we need and to re-test would be costly, so a decision has to be made if another test is required or not.

Legal Availability for Permit Applications

Overview:

Legal availability is an element (criterion) which must be analyzed in order to issue a permit under MCA 85-2-311. For both surface water and groundwater applications to be granted there must be a preponderance of evidence showing that water is legally available in the source at the flow rate and volume that the Applicant seeks to appropriate for the proposed period of diversion. When analyzing the information below please keep in mind that it is the MCA and ARM that should ultimately be acting as your guide when analyzing legal availability.

For the purposes of the Department's legal availability analysis, existing legal demands should be taken at face value on the abstract of the active version of a water right. If you are dealing with a statement of claim that does not have a volume on its abstract (typically an irrigation or stockwater right), review the

water right file for the volume claimed. Ultimately, that water user is limited by their claimed volume. If a claim is for stock use and no volume was claimed, calculate the volume using the adjudication standard of 30 gallons per day per animal unit claimed. If the claim is for stock use and there is a reservoir record, the legal demand should be either the capacity of the reservoir or the consumptive use of the claimed animal units, whichever is greater. Make sure that any volume assumptions are stated very clearly in the Preliminary Determination.

Please keep in mind that when dealing with surface water applications the Department will only be looking at existing legal demands on potentially affected surface water sources. However, with groundwater not only will the Department examine whether there is legally available groundwater in the zone of influence we will also be looking at legal availability in any surface water sources which the WMB identifies as being depleted from in their Depletion Report.

Determining legal availability is a very site-specific process. Each case is fact specific, and hydrologic variability can be found throughout Montana. The following documentation should serve as guidance relating to how the DNRC should be conducting its legal availability analysis. It is vital that the DNRC applies consistent reasoning to its technical approaches. Every source and reach of water in Montana is unique and will be analyzed on its own merit based on constraints contained in the following guidance.

MCA: The following MCA provides the basis for our analysis of legal availability.
§85-2-311 Criterion for issuance of permit

ARM: The following ARM provides us with guidance as to how we must analyze legal availability.
36.12.1704: PERMIT APPLICATION - EXISTING LEGAL DEMANDS
36.12.1705: PERMIT APPLICATION CRITERION – COMPARISION OF PHYSICAL WATER AVAILABILITY AND EXISITING LEGAL DEMANDS

Memos:
Technical Memorandum: Physical and Legal Availability of Ground Water, dated April 22, 2019
Madison Group Aquifer guideline document (deals with surface depletions for Madison Aquifer wells)
Legal availability of groundwater in the Flathead Deep Aquifer, dated March 13, 2018

Resources:

- USGS Montana Water Science Center (Montana USGS stream-gaging and other related information)
- GWIC (Montana Groundwater Information Center; Well and other groundwater related information)
- NRIS Water Right Query System
- GIS Software

Process:

There are numerous variables to consider in showing that water should or should not be considered legally available in the source throughout the area of potential impact at the flow rate and volume that the Applicant seeks to appropriate. There needs to be substantial credible information supporting any finding which states that water should be considered legally available. The following is a description of how the Department will process applications in the following situations:

Surface water legal availability

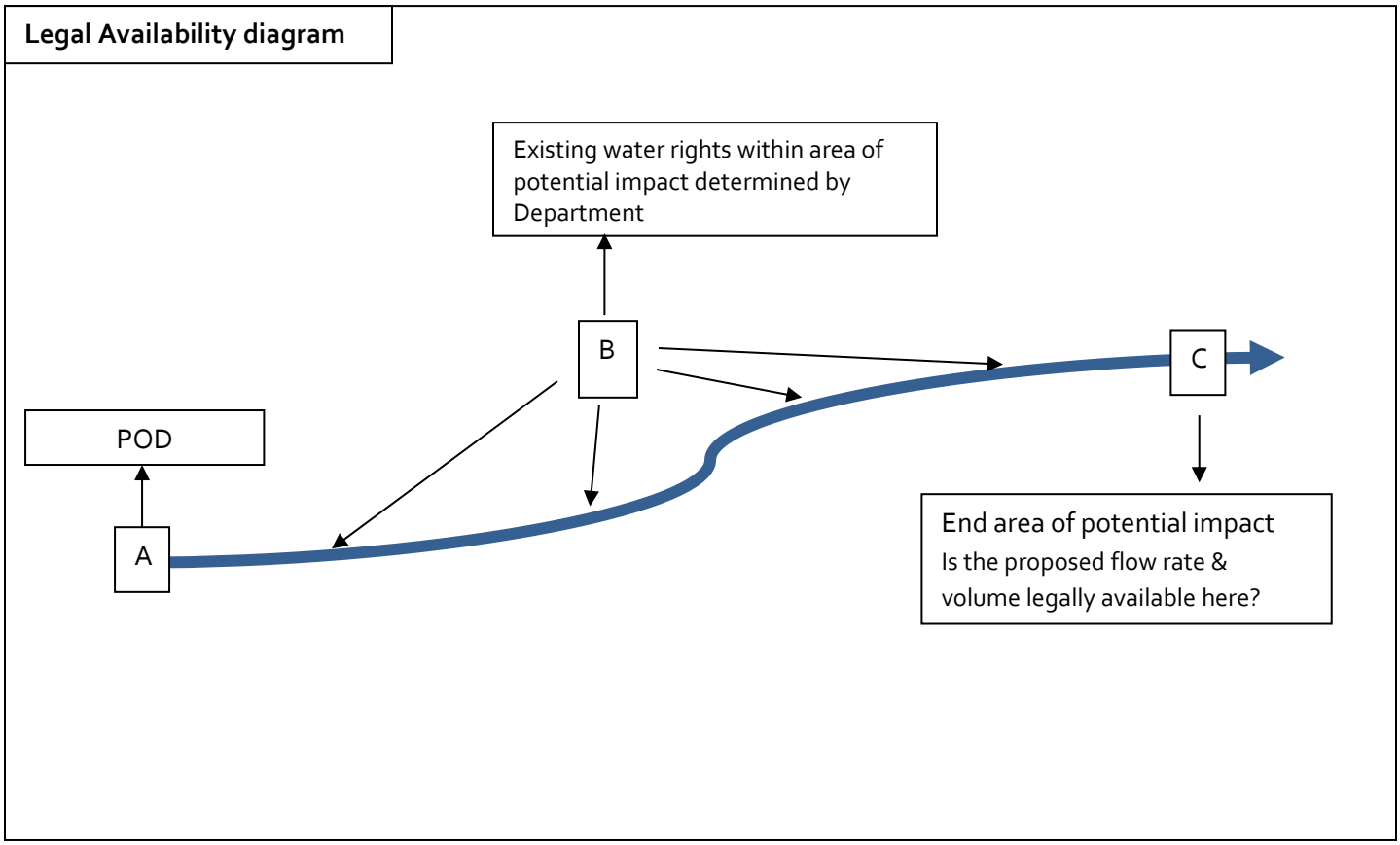
To calculate legal availability, the following should be done:

1. Determine the area of potential impact for the proposed appropriation. The area of potential impact could be limited to just a certain reach of the source of the proposed appropriation, or it could include downstream sources to which the source of the proposed appropriation is tributary to. It is up to the Regional Office to determine what the area of potential impact for the proposed appropriation will be.
2. Compile a list of all the existing legal demands within the area of potential impact. ARM 36.12.1704(2) determines our responsibility of identifying the legal demands within the area of potential impact for surface water appropriations.
3. Summarize the flow rate and volume of existing legal demands over the proposed period of diversion in a table.
4. To determine if water is legally available, compare the physical water availability you determined at the proposed point of diversion to the legal demands you determined over the proposed period of diversion. A table comparing the difference between the physical availability and legal demands is ideal in conveying when and in what amount water can or cannot be considered legally available. If there are multiple sources identified as within the area of potential impact, a comparison of physical availability and existing legal demands will need to be completed for these as well. Physical availability will need to be determined for the reach impacted, and the legal demands will need to be compiled within this reach. Follow the correct standard practice for calculating physical availability based on the nature of the source. For this analysis, the "POD" for the physical availability analysis will be considered the point where depletions first begin.
5. If the results of the comparison show that water can be considered legally available, the analysis is complete. Integrate the aforementioned table into the Technical Report and preliminary determination and use it as a basis in a finding showing that water should be considered legally available.
6. If the results of the comparison show that water cannot be considered legally available the Department will proceed with additional analysis to determine if water may be considered legally available.
    - If you have water right specific information (not general trends or statements) that you can describe and show by a preponderance of evidence that a specific water right or point of diversion should be considered at a lesser amount than the existing legal demand for that right or diversion dictates then you can describe the circumstances in your findings of fact in your Preliminary Determination. You must first make the comparison at the full amounts and then using water right specific information to adjust the comparison accordingly. However, the first comparison between physical availability and legal demands must take place without

any adjustments. If this extended step shows that water can now be considered legally available continue through the HB40 process. If you had the adjustment information available early on include that information in your Technical Report, otherwise it may be incorporated into your decision.

7. If at this point the comparison is negative, the Applicant will need to provide additional information. If the Applicant cannot provide substantial credible supporting information proceed with a decision to either deny or to grant with modifications some other amount that can be found to be legally available.

Legal Availability diagram



Groundwater legal availability

When considering legal availability for groundwater applications you are essentially looking at two things

1. Existing legal demands within the zone of influence (0.01 foot drawdown contour)
2. Existing legal demands within and below any reaches of surface water sources that are shown to be depleted. Example: If a groundwater application results in the depletion of 3 different surface water sources you will need to look at legal availability as described above in each of those sources as well as within the zone of influence. In other words, the surface water component of this analysis should be consistent between groundwater and surface water applications.

To figure out if water is legally available for a groundwater permit you should use the following process:

1. Groundwater applications are submitted to the WMB once they have been properly reviewed by the RO. The WMB will complete an Aquifer Test Report and a Depletion Report which details elements of the proposed appropriation including the aquifer flux, the surface water sources that would experience a depletion as a result of the proposed appropriation, and a determination of whether or not the aquifer can sustain the proposed appropriation.
2. If after analysis it is determined that the proposed groundwater appropriation will not deplete surface water, then all you need to do is verify whether or not groundwater is legally available within the zone of influence. This is done by:
    a. Summing the volume of existing groundwater legal demands within the zone of influence as provided in the Aquifer Test Report. For groundwater rights on the list which have not been assigned a volume, review the water right file for the volume. If no volume is available, such as on a 602 with "up to" 35 GPM and 10 AF language, it is up to the regional office to determine how to assign the volume.
    b. Subtracting existing groundwater legal demands from the aquifer flux (which is supplied by the WMB as part of the Aquifer Test Report)
    c. Integrating your results into the Technical Report
3. If after analysis it is determined that the proposed groundwater appropriation will deplete surface water, then you will need to both:
    a. Analyze legal availability within the zone of influence as detailed in step 2 above.
    b. Analyze legal availability on the surface water source(s) which are shown to be depleted in the Depletion Report.
4. At this point, you will utilize the previous guidance in this document in context with the application to ascertain how best to analyze legal availability in the surface water source(s) which will be depleted as a result of the proposed appropriation.
5. The Stream Depletion Report will generally give you a reach(s) that will be depleted. You need to consider **all** existing water rights within those reach(s) and downstream as appropriate.

What to include in a legal demands index:

DO include in a legal demands index	**DO NOT** include in a legal demands index
Active claims, permits, & changes	Non-perfected CD reservations
Perfected CD reservations	Non-perfected tribal rights
Instream flows	Non-perfected MT/WY compact water
Tribal rights	
Hydropower water rights	

Each RO already has a general understanding of the amount of water that can be considered legally available in the major sources in their area. As necessary RO's should track and monitor the legal availability in those sources including specific reaches on some sources in order to maintain knowledge of the legal availability. This specialized knowledge may play a role in selecting the area you will analyze for potential impact as further addressed below.

Variables to consider when analyzing the area for potential impact (How far downstream)

The following is a list of variables to consider when figuring out where to define the area for potential impact. These variables along with other site-specific variables should work in combination to allow you to come up with a finding of fact that spells out what area the DNRC defined as the area for potential impact and why. While great geographic variability in source characteristics is seen throughout the state, DNRC will strive to use a consistent approach in considering the different variables for determining the area of potential impact.

- ✓ Basin closure status
- ✓ Status of downstream hydropower
- ✓ Existing source and tributary knowledge
- ✓ Is the source a viable contributor to the mainstem?
- ✓ Ephemeral, intermittent, or perennial source?
- ✓ Connectivity issues
- ✓ Other major source tributary contributions downstream
- ✓ Connections to lakes and non-hydropower reservoirs

Hydropower water rights and legal availability:
Hydro power water rights should ALWAYS be considered if you have one downstream of the proposed appropriation. They may also come into play in the analysis of adverse effect as well.

There are some special considerations for hydropower in basins 76I, 76J, 76K, 76L, 76M, 76N & in the basins that are upstream to the aforementioned basins. Please contact the Central Office regarding the specific hydropower considerations that you should address when dealing with applications in these basins.

Groundwater application specifics:
Applicants for groundwater must evaluate legal availability of hydraulically connected surface waters within and downstream of the potentially affected reach if net depletion by a proposed use is predicted under ARM 36.12.1704 and no mitigation is presented. For the purposes of 85-21-311, MCA, surface water is defined in ARM 36.12.101(64). For the purposes of 85-2-360 through 85-2-362, MCA surface water also includes canals and drains, in addition to ARM 36.12.101(64).

Applicants for groundwater where net depletion by a proposed use is not predicted must demonstrate through their evaluation of adverse effect under ARM 36.12.1707 that existing legal demands for groundwater will continue to be met.

Specific Concepts and Q&A:

What if a gage has a long period of record, can't we assume that the physical discharge readings at the gage are really representing legally available water at the gage?
It has been determined that this assumption is not consistent with current law or ARM. However, we are open to exploring new ways to move in this direction as long as they are consistent with the MCA. For the time being we cannot make this assumption.

If a legal availability analysis comes up negative (there is not water legally available) can we make accommodations if there appears to be 'paper rights/inflated rights' on the source?

Yes. If we have **substantial credible** information showing that there are inflated rights we may consider it and make a finding of fact on it in our decision document. In order for the DNRC to make a finding that water is legally available it must be shown by a preponderance of evidence that the information at hand shows that water can be considered legally available. The DNRC will not accept a hunch so to speak. These findings need to be very specific. Stating something about a group of rights without specific documented information to support said statement does not work. The same is true for tributary source contributions.

Will the DNRC still accept explanations of how known patterns of use differ from legal water rights filings?

The DNRC can still accept explanations. However, the explanation would need to show with substantial credible information that the explanation makes sense. In order for the DNRC to make a finding that water is legally available it must be shown by a preponderance of evidence that the information at hand shows that water can be considered legally available. A signed affidavit from an Applicant stating that another water right owner does not exercise their water right is not substantial credible information.

Wesmont v. DNRC (groundwater application resulting in net depletion of surface water)

In the Wesmont v. DNRC case the court sided with DNRC. The case was in reference to a GW application that resulted in a net depletion of water on the Bitterroot River. The Applicant contended that the depletion was so small that there would not be an adverse effect and they need not look at legal availability. The court reaffirmed that the De minimis argument does not work with regard to the legal availability and adverse effect of water rights. The case also addressed the question of a constitutional right to a water right. The court stated that a person does not have a constitutional right to have a water right; they have a constitutional right to apply for a water right. If you would like to read the decision, you can get a copy from your managers or central office staff. The Sitz case also addresses De minimus.

When evaluating existing water rights for legal availability how have you seen historical flow rates get 'calculated' with regard to legal availability? Has anyone ever seen an application which attempts to use a set of standards to quantify these historical flow rates?

Typically claimed flow rates and volumes should be used, **not standards**. In specific cases, other amounts may be used but there must be justification as to why we should use these other amounts. For example, a claim indicates a flow rate of 20 CFS but there is substantial credible information that the ditch can only convey 15 CFS; then 15 can be used. Volumes may be based on other information (IWR/maybe standards in certain cases) if no other information is available.

Legal availability and adverse effect when an Applicant owns other water rights on the source

A legal demands index consists of all prior appropriations including those owned by the Applicant. We must consider other rights owned by the Applicant when looking at legal demands along with all other pertinent prior appropriations.

If it is the Applicant's own prior appropriations that yield water not legally available it may still be possible for the Applicant to provide a plan and likely conditions which will allow the Department to now consider and find the water to be legally available for the purposes of the application. It is likely that a condition would need to be added to the permit which states that the permit can be revoked if operation takes place outside of the presented plan. Essentially the plan will need to show how the Applicant will not be double-dipping, but rather substituting senior water for a more junior use presented in the application. This would also likely trigger a measurement condition which would effectively show that double-dipping

would not be taking place. It is logical to assume that the denser the appropriations are on the source the more difficult it would be to present a workable plan.

Adverse Effect for Permits

Overview:

When an Applicant applies for a new Provisional Permit, it must be shown that the new appropriation of water will not adversely affect any prior appropriators. The Applicant must have a reasonable plan to prevent adverse effect during times of water shortage should the situation arise. Typically, if water is proven to be physically and legally available, the adverse effect criterion will be easily attainable though this is not always the case. Sometimes it takes a proper plan (i.e. only appropriate when a gage hits a certain level or mitigation) to prove that water can be considered legally available.

MCA: The following MCA provides the basis for why we analyze adverse effect criteria when processing provisional permits.

§ 85-2-311 Criteria for issuance of permit

ARM: The following ARM provides us with guidance as to how we must analyze adverse effect.

36.12.1706: PERMIT APPLICATION CRITERION – ADVERSE EFFECT

Memos & Policies:

Policy: A list of water rights taken into consideration when evaluating adverse effect criterion should be generated and included in the application file. The legal demands list will suffice for this purpose unless for some reason additional water rights were reviewed for potential adverse effect. The list can be included in technical report or as an appendix to the technical report.

Memos:

Permitting in the open Clark Fork and Flathead basins (TRL TFLC Memo), dated June 9, 2008

Permitting in the open Clark Fork and Flathead basins Follow-up to June 9, 2008 Memorandum, dated May 1, 2009

Forms & Addenda:

Form 600 GW Application for Beneficial Water Use Permit, Form 600 SW Application for Beneficial Water Use Permit: These forms cover the basics of adverse effect including the plan to prevent adverse effect and information regarding call and water commissioners on surface water sources.

600 GW BCA Addendum: Typically, within a Basin Closure Area, the Applicant will need to mitigate any effect to a surface water source. This form leads the Applicant down that path and essentially elaborates on their plan to prevent adverse effect.

Process:

The adverse effect and physical/legal availability criteria are closely related. If it has been proven that the physical and legal availability criterion can be met first; then the adverse effect criterion will generally be met. If legal availability cannot be met without an adequate plan, this criterion becomes significantly more involved, however, it can still be proven that adverse effect will not occur if the plan is adequate and we can make a finding that shows by a preponderance of evidence that there is no adverse effect. If call has been made on a source or if a water commissioner is present on the source, it does not necessarily mean that adverse effect will occur. These factors may simply indicate that there may a general availability issue on the source.

For surface water sources, the Applicant should provide information regarding the use/non-use of a water commissioner. The Applicant should also discuss their knowledge of source conditions during dry years and if call had been made on the source in the past. You may have some of this information as well and the information they provided should only be used if you don't have contradicting information. This information is addressed just to give you an idea of source conditions and if there is an impartial distributor who will oversee fair dispersion of water.

Review the information the Applicant provided. Does it appear that their plan adequately addresses the issues? Is the plan reasonable?

Additionally, there could be an enforcement action on the source which could impact the adverse effect analysis for the proposed appropriation. Offices should review the "Water Distribution Projects" page on the DNRC Adjudication website and the "Enforcement" page on the Water Court website to determine if any enforcement actions exist which could impact the Adverse Effect analysis. Sometimes enforcement actions include water commissioners, and sometimes they do not. There may be an enforcement action on a source one year and not the next year. If you would like additional information on a specific enforcement action, please contact the Adjudication Bureau Chief.

Surface Water

Compare the information you have regarding legal availability. If water is legally available 9 out of 10 years how might this new use affect downstream users on that 10th year? Look at the flow requested and the volume. What about the proposed diversion schedule? Are there only issues during certain months or all months? Visit with WMB staff regarding expected return flows. Maybe return flows will re-enter the source above other appropriators and the timing will not cause an issue because water is available in the early irrigation season.

Groundwater

Remember that we only look at groundwater on an annual basis. WMB staff will model future impacts to other wells based on the proposed appropriation. Once WMB has provided the analysis, document the affect the proposed usage will have on neighboring wells. Will enough water remain above their pumps, so they aren't negatively impacted? Generally, we assume drawdowns of less than 1 foot will not be an issue, but drawdowns of higher magnitude may be all right as well. Review the comparison of available water columns to the expected drawdowns for all water rights within the 1-foot zone of influence as determined by WMB in the Aquifer Test Report.

WMB will also determine expected depletion from surface water sources. Look at those surface sources and the associated legal demands. Are they not met at any time during the time the source will be depleted? Will expected return flows offset any negative impacts to the surface source?

Open Basins

If everything discussed above seems okay, does their plan address any major issues during times of water shortage? If so, they are likely good to go.

Closed Basins (including those smaller basins that are "effectively closed")
The Applicant will likely need to mitigate any depletion to surface sources. Review the 600 GW BCA for information regarding their mitigation plan or other type of plan to offset adverse effect. If the Applicant fully mitigates any surface depletion, including the proper timing of flows, then their plan to prevent adverse effect is likely good to go.

Has the change been issued or do they have a contract to purchase mitigation water in place? If so, you can condition the permit on the mitigation plan. We cannot grant a permit on prospective mitigation. For permits in closed basins, the Applicant must submit a combined permit and change application (unless the mitigation plan does not require a change such as for contract water). If it is determined that mitigation is needed and there is no change, then we cannot grant the permit. Be sure to address specifics in the condition and let the Applicant know that they cannot exercise the permit until the mitigation plan is in operation.

Water does not appear to always be legally available
It's okay—even if water is not legally available in every month of the requested appropriation, it can be considered legally available if it is conditioned properly and the plan to prevent adverse effect is comprehensive. For example, if water is not legally available in July and August, you can set a trigger flow at a nearby gaging station to allow the appropriator to divert. If it was determined that when the chosen gage hits 1200 CFS there is enough water to go around and the person can appropriate, then you can condition the permit as such. The appropriator now knows that if the gage is reading 1199 or lower they cannot divert/use water.

Keep in mind that if water has been stored in priority, the person who stored the water can use the water at a later date even if water is not available for more senior users directly from the source.

Specific Concepts and Q&A:

Adverse Effect—what is a "shortage of water?" Do we want detailed plans to prevent adverse effect in the DPD or should we simply say that if call is made the pump will be shut off? More information on "call" is needed.
"Shortage of water" and "call is made" infer the same thing. Call is essentially the trigger point for when there is a shortage of water. If call is made, the junior only needs to curtail their use so that adverse effect to a senior is avoided. For example, if there are only 2 users on a source and each user has a right for 10 CFS but the stream is only flowing 15 CFS, the junior is still allowed to use 5 CFS as the use of that 5 CFS is not creating an adverse effect to the senior. Under current MT law, a senior can make call to ANY junior user…call does not need to be made to the most junior user on the source nor does call need to be made to all juniors. If FWP makes call on all junior appropriators and there is water legally available after FWP's right is satisfied, then the most senior of the called appropriators may resume diversion. The remaining water is not prorated through junior users. A realistic and detailed plan for the use should be submitted. It is not realistic to say that the pump will be shut down in the event a call is made when talking about a subdivision. So, a plan such as: odd/even lawn and garden irrigation days, then limiting to 1 day per week, and then completely stopping all outdoor use would be preferable.

Legal availability with regard to adverse effect
Given that an Applicant has explained how the water should be considered legally available and we make a finding as such, the Applicant would still be required to explain how the operation of the right will take place such that there will not be an adverse effect to others and how the right could be controlled if an adverse effect were created such as when call is made.

Regarding the development of a new mine pit/gravel pit, DEQ has required the Applicant to obtain a DNRC consultation regarding adverse effect to WR holders. What should DNRC provide?
Visit with the Applicant about any water rights they may need to obtain. Also, discuss other nearby water rights that may be affected by their development then draft a brief memo or sign something the Applicant may provide explaining that you discussed this with the Applicant. Sometimes the Applicant will bring a form for you to sign in lieu of a memo.

Wesmont v. DNRC (groundwater application resulting in net depletion of surface water)
The court sided with DNRC on this one. The case was in reference to a GW application that resulted in a net depletion of water on the Bitterroot River. The Applicant contended that the depletion was so small that there would not be an adverse effect and they need not look at legal availability. The court basically reaffirmed that the De minimis argument does not fly with regard to the legal availability and adverse effects of water rights. The case also addressed the question of a constitutional right to a water right. The court stated that a person does not have a constitutional right to have a water right; they have a constitutional right to apply for a water right. If you would like to read the decision, you can get a copy from your managers or central office staff.

What is the policy on adverse effect in relation to someone else having an inadequate diversion and with regard to people being able to reasonably exercise their right?
We don't have a directive on how to deal with these situations. Each case is fact specific as these situations are highly dynamic and dependent on a multitude of variables including things like: aquifer/well depth, drought cycles, local knowledge, and practices. With so much variability involved it is difficult to nail down a specific way to deal with all of these situations. That said we are always willing to talk about specific circumstances.

Legal availability and adverse effect when an Applicant owns other water rights on the source
A legal demands index consists of all prior appropriations including those owned by the Applicant. We must consider other rights owned by the Applicant when looking at legal demands along with all other pertinent prior appropriations.

If it is the Applicant's own prior appropriations that yield water not legally available, it may still be possible for the Applicant to provide a plan and likely conditions which will allow the Department to now consider and find the water to be legally available for the purposes of the application. It is likely that a condition would need to be added to the permit which states that the permit can be revoked if operation takes place outside of the presented plan. Essentially the plan will need to show how the Applicant will not be double-dipping, but rather substituting senior water for a more junior use presented in the application (which would be more easily callable). This would also likely trigger a measurement condition which would effectively show that double-dipping would not be taking place. It is logical to assume that the denser the appropriations are on the source the more difficult it would be to present a working plan. Given that an Applicant has explained how the water should be considered legally available and we make a finding as such, the Applicant would still be required to explain how the operation of the right will take place such that there will not be an adverse effect to others and how the right could be controlled if an adverse effect were created such as when a call is made.

Adequate Means of Diversion for Permits

Overview:

Adequate means of diversion is an element (criterion) which must be analyzed in order to issue a permit under MCA 85-2-311. The Applicant must prove by a preponderance of evidence that the proposed means of diversion, construction, and operation of the appropriation works are adequate for the proposed beneficial use. Substantial credible information would show that water could be withdrawn from the source and conveyed to the place of use in the amounts applied for without unreasonable loss through design or operation. When analyzing the information below please keep in mind that it is the MCA and ARM that should ultimately be acting as your guide when analyzing the diversion means.

MCA: The following MCA provides the basis for why we analyze adequate means of diversion.
85-2-311 Criteria for issuance of permit

ARM: The following ARM provides us with guidance as to how we must analyze adequate means of diversion.
36.12.1702: PERMIT APPLICATION CRITERION – ADEQUATE DIVERSION MEANS AND OPERATION

Forms & Addenda:

The following forms & addenda include a description of the diversion works.

- Form 600 SW (Surface Water Application for Beneficial Water Use Permit):
- Form 600 GW (Groundwater Application for Beneficial Water Use Permit):
- Form 600B (Criteria Addendum Application for Beneficial Water Use Permit for Appropriations Greater than 5.5 CFS and 4,000 AC-FT):

Process:

The Applicant must provide credible information that the diversion works are capable of delivering the amount of water requested without unreasonable loss through design or operation. Preliminary design plans must be submitted that meet the requirements of ARM 36.12.1707. The first step in this analysis is to determine how much water is required for the proposed beneficial use. Water requirement standards are given in ARM 36.12.115. When the permit involves a well or other groundwater diversion, the diversion must be able to produce the requested flow rate and volume within the constraints of well efficiency and the available water column. Drawdown from an adequate aquifer test can be extrapolated for the period of diversion and compared to the water column in the well to show an adequate height of water will remain above the pump. If a well does not need to be pumped continuously or when multiple wells are to be pumped in unison, drawdown in each well can be modeled and compared to available water columns while taking into account drawdown interference between wells and well loss.

In cases where it has been determined that there is a possibility for adverse effect, conditions requiring water measurement may be necessary. The DNRC conducts a yearly Water Commissioner training program which provides the basics of water measurement. Information relating to water measurement is available from numerous sources including the following:

- https://www.usbr.gov/tsc/techreferences/mands/wmm/index.htm - (Water Measurement Manual USDI, BLM)
- Irrigation Water Measurement, University of Wyoming – (Provided at Water Commissioner training)

General Examples:

Adequate Diversion

FINDINGS OF FACT

59. The proposed means of diversion is a 75 horsepower Cornell Pump (Model #5RB) capable of diverting the requested flow rate and volume of water. Water conveyance will occur through a 12 inch mainline (plastic pipe) to a 188.7 acre center pivot sprinkler irrigation system. Total sprinkler system length will be 1,525 feet operating at a pressure of 80 pounds per square inch. The system was designed by Billings Pump & Irrigation from Billings, Montana, and certified as adequate by Otto Ohlson, retired Engineering Tech from the US Natural Resources and Conservation Service. May 2[illegible]010 letter from Otto Ohlson; Irrigation System Proposal, Billings Pump & Irrigation, September 16, 2009.

The Department finds the proposed means of diversion, construction, and operation of the appropriation works are adequate for the proposed beneficial use.

The above example proposes to use 2.52 CFS up to 419.3 AF to irrigate 188.7 acres under a new pivot. Submitted design specifications show the system is capable of diverting the requested flow, which represents adequate irrigation, (6 GPM / AC). The Period of Diversion outlined earlier in the Preliminary Decision was determined to be April 15 to September 1. The proposed system would be able to operate 24 hours/day for 83.8 days of the total 138-day Period of Use.

Specific Concepts and Q&A:

What if an Applicant is adding more flow and volume to an existing well, specifically what does the Department look at regarding adequacy of diversion?

The Department will evaluate adequacy of diversion for the total use from the well and all other criteria for only the new (increased) amount (flux, adverse effect).

Beneficial Use for Permits

Overview:

When an Applicant applies for a new Provisional Permit, they must prove that their new appropriation is a beneficial use of water. There are rules that establish "reasonable" amounts of water for several different purposes and the Applicant may use those amounts or come up with different amounts as long as they can be justified.

MCA: The following MCA provides the basis for why we analyze beneficial uses.

§ 85-2-311 Criteria for issuance of permit

§ 85-2-102 Definitions

ARM: The following ARM provides us with guidance as to how we evaluate beneficial use.

36.12.1801: PERMIT AND CHANGE APPLICATIONS – BENEFICIAL USE

36.12.115: WATER USE STANDARDS

Memos & Policies:

Technical Memorandum: Pond and Wetland Evaporation/Evapotranspiration, dated March 14, 2018

Forms & Addenda:

The following forms & addenda are directly related to beneficial use.

- Form 600 GW Application for Beneficial Water Use Permit, Form 600 SW Application for Beneficial Water Use Permit: These forms cover the beneficial use criterion for all types of new permit applications. Look in the purpose section as well as the beneficial use section for information regarding these criteria.

Process:

The Applicant must provide some information including why this should be considered a beneficial use. You may relate that back to definitions in § 85-2-102, however, as long as there is some benefit provided to the Applicant or other people (including the public in general), then the use is considered beneficial. The Applicant must also define the amount of water they are seeking. If they are requesting amounts that are addressed in ARM 36.12.115, then they do not need to justify those amounts (volume). That said if the appropriation involves supplemental water rights, then the aforementioned ARM may not be suitable. Requested flow rate of an application always needs to be justified by the Applicant.

If the Applicant requests an amount that does not conform to DNRC standards, they must provide information as to why the amount requested is the amount needed. If not provided with the application materials, it would need to be requested in a deficiency letter. The Applicant may provide other credible information such as calculations from IWR to overcome DNRC standards. Of course, there are purposes that are not addressed in our rules, so the Applicant will need to provide all information in those instances. Review the information provided to decide if the information conforms to being substantial credible evidence. If so, proceed to the next criterion. As always, you may request additional information if they didn't provide enough for you to properly evaluate the criterion.

If there are supplemental water rights involved, the use from each water right must be separated from the others. The Applicant may use DNRC standards, but they may need to reduce their request by the amount of water provided by supplemental water rights. For example, if they wish to irrigate 5 acres of lawn and garden which requires 12.5 AF according to DNRC rule, and they have another water right for the same acreage that provides 10 AF, they can only request 2.5 AF from this application unless they prove that more volume is needed via some other methodology.

Specific Concepts and Q&A:

What is required from an Applicant to document beneficial use for a wetlands application?

Beneficial use will not be looked at in terms of wildlife, waterfowl, etc. Is there any difference between an agency (ie FWP, MDT, etc) and a private individual applying? No. However, MDT would like to keep track of their wetland mitigation credits. If an application they submit is for wetland mitigation credits, then we must see the documentation.

- See Wetlands memo

When is a water right needed for use of sewage effluent?

Refer to the HB52 memorandum for guidance.

How do we look at beneficial use for fish ponds?

We do not have straight forward guidelines or rules for addressing beneficial use with regard to fish ponds. This is because fish ponds tend to have very dynamic variables associated with them (size, number of fish, species of fish, o_2 content, flow needs, and location of pond….). What we do have is a set of decision documents which show examples for both granting and denying based on the beneficial use criterion. These examples are located on ROCO---Ponds examples. Until we have established guidelines, use these examples to help you craft the beneficial use section of your PD. Having information from a fisheries biologist and references to scientific literature helps to support the beneficial use of the pond(s). It is important too that the literature or documentation getting cited supports the application at hand. Citing literature that pertains to the needs of catfish in Louisiana does not correspond to what trout will need in a small pond at high elevations in MT. Please let us know if you have any questions regarding fish ponds and beneficial use.

Possessory Interest for Permits

Overview:

Possessory interest is an element (criterion) which must be analyzed in order to issue a permit under MCA 85-2-311. An Applicant must have possessory interest, or the written consent of the person with possessory interest, in the property where the water is to be put to beneficial use. Exceptions include applications where the stated purpose is municipal, sale, instream flow, mitigation, or water marketing. The Applicant's signature on form 600 attests to possessory interest. If any element of the proposed water right involves federal land, the Applicant must provide proof of special use authorization.

MCA: The following MCA provides the basis for why we analyze possessory interest
85-2-311. Criteria for issuance of permit.

ARM: The following ARM provides us with guidance as to how we must analyze possessory interest.
36.12.101 DEFINITIONS
36.12.1802 PERMIT AND CHANGE APPLICATION CRITERION - POSSESSORY INTEREST

Forms & Addenda: The following forms require the Applicant to affirm possessory interest.

- Form 600 GW (Groundwater Application for Beneficial Water Use Permit):
- Form 600 SW (Surface Water Application for Beneficial Water Use Permit):

Process:

The Applicant's signature on form 600 attests to possessory interest. Make it very clear that the Applicant may be asked to provide proof of possessory interest, or written consent of the person/persons owning the property where the water will be put to beneficial use. If there is any doubt as to the authority of a person to sign the application, require the Applicant to provide additional information, (power of attorney, and corporate records). Although it may not be professional, it is not illegal to cross out a signature on a form and then have the proper party sign.

If any element of the proposed water right involves federal land, the Applicant must provide proof of special use authorization. The most common type of special use authorization whereby a private individual holds a water right located on federal land involves grazing leases.

Specific Concepts and Q&A:

Can a conservation district be listed as the Applicant for irrigation? The district itself is not irrigating, so maybe a better purpose would be water marketing? Eventually they want to turn this over to the water users, but for now the conservation district is the Applicant. If we did look at it as water marketing, they would have to comply with 85-2-310(9)(c)(v), and I assume they would need to provide me a copy of the water user contracts….

If the CD has a water reservation, they cannot apply for a permit prior to using that reservation in full.

The CD can apply for either irrigation or marketing. If applying for marketing, they will need contracts to prove they have people ready and waiting for the water. This may allow for a longer completion deadline. If they apply for irrigation, the "municipal supply" **possessory interest** language should be used in the decision document.

36.12.1802

(1) An Applicant or a representative shall sign the application affidavit to affirm the following:

(a) the statements on the application and all information submitted with the application are true and correct; and

(b) **except in cases** of an instream flow application, or where the application is for sale, rental, distribution, or is a municipal use, **or in any other context in which water is being supplied to another and it is clear that the ultimate user will not accept the supply without consenting to the use of water on the user's place of use**, the Applicant has **possessory interest** in the property where the water is to be put to beneficial use or has the written consent of the person having the **possessory interest**.

Water and Sewer Districts—which comes first: permit or boundary expansion?

Water and Sewer Districts are unique and are not considered municipalities. They are governed under MCA Title 7, Chapter 13 and each district has a unique set of articles of incorporation which further dictate how the body must operate. That said in order to address the possessory interest criterion in a permit application, water and sewer districts need at a minimum written permission from the landowners within the proposed place of use. Upon perfection of the permit it must be shown that the water and sewer district is utilizing the water in the proposed place of use. This could be accomplished by showing an expanded boundary, providing proof of hookups, or providing contracts with users within the place of use.

Special Permit Considerations

Temporary Permits

A temporary permit may be granted for appropriations intending to last a short period of time. Road construction, seismic exploration, and hydrostatic testing are some examples of temporary uses. Application for a temporary permit is made on Form 600 and any applicable required addenda. The permit must be issued for a specific period of time with an automatic expiration date. The expiration date will be the last day of

intended use. A temporary permit expires on its own and cannot be extended. If a project is not completed by the expiration date of the expiration date of the permit, a new application must be filed, and a new permit must be obtained for the appropriation of water to legally continue. Temporary permits are subject to the same criteria and basin closure requirements as provisional permits.

Processing a temporary permit is the same as processing a provisional permit with the following exceptions:

- Temporary permit is selected as the water right type on the water right screen in the database.
- Prior to public notice add an II Remark stating, "This application is for a Temporary Permit to expire in ____ years". (Enter the number of years) (Inclusion of this remark is for public notice purposes.)
- When issuing a temporary permit, remove the II Remark added for public notice and add the TP Remark (This Temporary Right Expires on _____. Enter expiration date.) Do not enter a Project Completion Due event.
- Set the expiration date to the last day of the period of use for the number of full years requested. If the Applicant requested 4 years, the period of use is May 1 – September 30, and the permit is issued in March of 2015, the expiration date would be September 30, 2018. If the permit is issued July of 2015 the expiration date would be September 30, 2019.
- Add the Temporary Permit/Change Expiration event.

When the permit expires:

- Change the version status and the water right status to Expired.
- Add the Terminated/ Denied/Revoked event and include "Temporary Permit Expired" in the comment field.
- Send the file to the Central Office.

Interim Permits

Interim permits are essentially permits that can be granted for a specific timeframe prior to a formal authorization of the permit being granted. If there is not any substantial information to show the permit criteria cannot be met, then we can issue an interim permit. The interim permit allows the Applicant to begin appropriating water for the beneficial use.

Read ARM 36.12.104 very carefully before considering moving forward with an interim permit as it very specifically defines the limits and expectations involved in issuing an interim permit.

ARM 36.12.104 implements MCA 85-2-113 and 85-2-311 to 314 and specifically grants the Department authority to adopt rules and govern the issuance and terms of interim permits. The MCA does not give the Department the authority to issue interim changes. The Department cannot issue interim changes under any circumstance.

An example Interim Permit along with the Interim Permit template can be found on ROCO in the Rules\Interim Permits folder.

An interim permit can be granted once the Department has made a decision to grant a permit application and the decision has gone on to be publicly noticed. This is because it is at this point; we know there should not be any substantial information known to the Department that the criteria cannot be met. Be very careful when

issuing an interim permit. Make sure there is a definite end date. A good end date to select is the date the PD to grant or deny must be issued. The processing of the application must continue even if an interim permit is issued. It is also advisable to make it clear that those appropriations under the interim permit must cease if a valid objection is received.

The environmental assessment does not need to be completed prior to issuing the interim permit.

Interim Permit Issuance

1. Assign an expiration date
2. Prepare conditions or terms for the interim permit
3. Draft the interim permit
4. The database should reflect the application as a pending file

Note: There is no such thing as an interim change

Adding Just a Flow rate or Just a Volume

During a Managers Meeting which took place on 02-26-2013 the following was decided regarding this matter.

If you already have an application in prior to 02-26-2013 you can follow through with processing that application for just a flow rate or just a volume, even if that application adds a new POD to the existing system as part of the application.

For applications received after 02-26-2013 that aim to add just a flow rate or just a volume to a system **AND** the application also adds a new POD we need to make sure that the water right involved in the application contains both a flow rate and a volume. More simply put you cannot process an application which adds a new POD for just a flow rate or just a volume, it must contain both.

First off it is vital to differentiate two different situations that relate to this issue.

1. The situation where an Applicant wants to add just flow or volume to a system through an existing point of diversion.

2. The situation where an Applicant wants to add just flow or volume to a system by adding a new point of diversion.

With regard to situation 1 above nothing is changing in our processing after 02-26-2013. As per ARM 36.12.1701(5)(j) an application that is **only** to increase the flow rate or volume must reflect a value of zero in the nonapplicable field. For example, if an Applicant is applying to only increase the flow rate the volume field should reflect zero. Again, remember this is **only for adding to an existing POD**. This does not work if a new POD is being added per the application.

With regard to situation 2 above as discussed for applications received after 02-26-2013 if a new POD is being added per the application it must have both a flow rate and a volume.

Keep in mind when you are processing these that the analysis will only be in the context of the newly acquired water. Be sure to include remarks in the database that describe the nature of the association or supplemental nature of the new right to the existing right so that the relationship is clear to anyone looking at the water right abstracts.

Procedural Considerations

Amendments

(ARM 36.12.1401) Anytime an Applicant changes their original application, it is an amendment. If there is a need to amend the application, have the Applicant use the Amendment to Application form which is located in the ROCO folder.

If the Applicant is simply supplying additional clarifying information within the scope of the application, then a formal amendment to the application is not necessary. That is not to say that the Department would not need to pursue a Waiver of Timelines with the Applicant should the situation warrant such an action.

Amendments include anything that is:

- More than a mere refinement
- Increases requested flow rate or volume
- Requires the Department to either redo or complete a different analysis
- Applicant does not dispute calculations in Tech report that are less than the proposed*
- Example:

Original application for a fish pond is 20 AF, Applicant requests a change to 50 AF—this is an amendment.

Siebel Supreme Court Opinion stated that "significant modification" to an application becomes a new application.

Amendments **may** reset our timelines for review. If an Applicant submits a major amendment, timelines will be reset. This includes the ability to send out a new deficiency letter. Typically, when determining whether or not an amendment is a major or minor amendment, the office processing the application should review the elements being amended to determine the significance of the amendment. An example of a minor amendment would be where the Applicant reduces their flow rate or proposed place of use. An example of what could constitute a major amendment would be an expansion of the place of use or increase in flow rate which could significantly impact the Department's analysis of the proposed water use.

At some point If the changes proposed in the amendment to the application are really major; the Applicant may want to start over with a completely new application. Talk with your regional manager and the Central Office if you have questions about whether or not a major amendment(s) constitute the need for a new application. In this situation, the Department may transfer the initial application fee to the new application.

*It has been decided that if in the Department's technical report, the Department's calculations are based on less than what was proposed (acres, flow rate, or volume etc.) and the Applicant does not dispute the calculations, it is considered an amendment to the application. The application will be considered a "grant" not

a "grant in modified form." The Applicant needs to be made aware that this is case so be sure to include the applicable language in your C/C letter.

Conditions

- If a formatted remark (condition) exists it must be used so always check to see if a formatted remark exists before you go about adding it as an ii remark (freeform). This is important because statistics and queries are often ran based on remarks and if everything is entered as an II remark, functionality is lost.
- Only add conditions when they are necessary to meet the criteria
- Conditions can be anything you believe is needed to meet the criteria
- II Remark if no standard exists and no specific placement is needed
- The Applicant must sign off on the conditions to do a PD to grant
- Written in the application
- Applicant returns a signed acknowledgement that the conditions will be added
- Conditions on a Draft PD to Deny—the Choice is yours!
- Discuss conditions throughout as you normally would. This tells the Applicant that if the application were to be granted, it would be subject to the conditions
- If you go to a Final PD to deny, remove the conditions
- Don't mention conditions as the usage will not be implemented as requested
- If change to a PD to grant, the conditions must be added

Environmental Assessments

The Montana Environmental Policy Act (MEPA) requires state agencies to consider the physical, biological, social, and economic implications of their actions. Decision-making on permit & change applications requires MEPA compliance.

The Department shall conduct an environmental assessment on all permit and change applications. This assessment must be in the approved format. During the assessment, the Department shall determine if an environmental impact statement (EIS) is necessary. The Department may adopt another agency's EIS findings.

Because the MEPA process requires full public disclosure of any environmental impacts, all environmental assessments must be posted on the internet.

Full EA instructions & templates are contained on the ROCO drive.

Variances

The only two variances that the Department can and does deal with are explicitly identified in rule. The Department cannot grant variances other than the two variances set forth in rule which are:

36.12.1702 PERMIT APPLICATION CRITERIA - PHYSICAL SURFACE WATER AVAILABILITY
(4)(d) A request for a variance from measurement requirements may be submitted for non-perennial streams. The request must be submitted in writing to the appropriate regional office.

36.12.1703 PERMIT APPLICATION CRITERIA - PHYSICAL GROUND WATER AVAILABILITY
(4) The requirements of ARM 36.12.121 must be followed, unless a variance has been granted by the Department.

Application Termination

Withdrawn by Applicant

When an application is withdrawn by the Applicant during processing; a copy of the signed letter withdrawing the application must be placed in the file.

Annotate the withdrawal, include a copy of the withdrawal letter in the file and send the file to the Central Office to complete processing.

Deficiencies not Met

As described in ARM 36.12.1501, if the application is not considered correct and complete within 120 days after the deficiency letter is sent, terminate the application with a standard termination letter that points out exactly what Administrative Rules the application did not meet. The termination letter can only list the deficiencies not addressed from the deficiency letter. A standard termination letter is available on the ROCO Folder.

Send the termination letter to the Applicant, annotate the termination, include a copy of the termination letter in the file and send the file to the Central Office to complete the termination processing.

Data Entry

1. Under the `Events Tab` add a `TERMINATED / DENIED / REVOKED` event with the date of the termination document, either a letter of withdraw or a termination letter.

Relevant Statutes and Rules

36.12.1501 PERMIT AND CHANGE APPLICATION DEFICIENCY LETTER AND TERMINATION

PD Writing Tips & Guidance

DO:

- Write with conviction—the findings are yours, embrace them!
- Include all information on which your decision is based
- Explain each topic so someone with no prior knowledge of the subject can understand your decision
- Your decision may be used by the Hearings Unit or even District or Supreme Courts
- Include tables as well as the written description
- If applicable, state that a hydrologist reviewed the application and finds the information/methods credible, but then make your own finding
- Reference conditions in the proposal and criteria sections as well as the end of the document
- Review the Writing Tips & Standards document

DO NOT:

- Include unnecessary information
- Say "the Applicant believes/stated/etc" without following up with a Department finding. Don't use "I find."

- Include the proposed appropriation when discussing legal demands
- Use ambiguous/subjective terms (lots, should, typically, only)
- Include percentage statements

Writing Tips for PDs:

1. Use the correct template. The current templates will always be kept in the ROCO folder.

2. Don't remove Conclusions of Law from the Template unless it has been vetted by legal. The Conclusions of Law highlighted in grey in the Template can be added as necessary depending on the specifics of the decision.

3. Write the PD as though a reader has no knowledge of the application nor the facts included in the application. In the decision document, the reader should not have to review any part of the file to understand the facts in the file. Don't include statements that say X is included in the application or where something is located in the file. The reader should be able to discern why the writer, based on the facts, made the decision.

4. Application details need to be included in the PD that provide the specifics of an application. What is the source, POD, place of use, flow rate, volume, etc. This is especially important for changes to know exactly *all* the proposed changes. A good base needs to be developed for the reader to understand what the application is for. The application details can follow the same order as the public notice, but just make it in paragraph format, rather than sections.

5. Be consistent. If flow rate is talked about in GPM terms, then continue to use GPM. Don't use CFS in some parts.

6. When referencing source, flow rate, volume, period of use, period of diversion, etc., state the source name, the actual flow rate & volume applied for, and the actual period of use. This way, the reader doesn't have to go back to the Application Details section of the PD to find the information.

7. Only the existing legal demands on the source should be included in the legal demands table. The Applicant's application is not a legal demand.

8. If the application is bringing an illegal appropriation of water into compliance, those details are not pertinent and often confuse the reader. The PD should focus on the present application as it relates to a new use under the water use act.

9. Provide facts of the applications, not assertions.
   Fact: A thing that is known or proven to be true.

10. Make *your* findings rather than saying "Applicant says" or "Applicant contends". Identify what information is factual. Don't use such terms as maybe; will likely; unlikely; typically; etc.

11. The information contained in the Technical Report that the Department will use in the criteria assessment should be copied into your PD as findings of fact. All you should have to do is copy the elements contained in Technical Report into the relevant criterion related sections of the PD and add a sentence or two which explains what the DNRC is finding and if the information proves by a preponderance of the evidence that the specific criterion is being met. Enough information must be included for the PD to stand alone, however for complicated calculations, the PD does not have to go into the same detail as the Technical Report on how the Department got to the findings. If you choose not to include in the PD all of the steps taken in the Technical Report, you must reference that the Technical Report has the full detail on how the determination

was made.

12. Make your findings rather than saying I concur with the Department Hydrologist (state the hydrologist's technical findings, but remember you make any ultimate finding). You don't want to imply that you have the same level of knowledge unless you do.

13. Do not make findings that drawdown of X, as our hydrologists state, "typically" do not cause adverse effects. Make a finding based on *this* case.

14. Make an absolute finding that the criteria have or have not been met. Do not say there "should" not be or it is "unlikely" that an adverse effect will occur.

15. Reference condition requirements in a finding. For example, why a condition of X is needed in order for the criteria to be met. Then add conditions to the end of the document. Don't say the Applicant says they will be sure to do A or B to prevent adverse effect.

16. For permits that require a change for mitigation, a mitigation plan must be included in the permit application and must state the mitigation details and explain why the mitigation plan is adequate to mitigate the adverse effects. There cannot be a complete evaluation in adverse effect if there has not been a discussion of the adequacy of their *plan* regarding the exercise of the permit. Also remember that in the permit application, in the mitigation plan, the amount, timing and location of mitigation water has to be analyzed. Under the Adverse Effect section, include the following sub-sections in permit applications that include a mitigation plan: Mitigation Strategy; Mitigation Amount; Mitigation Duration; and Mitigation Location.

17. Be sure the information under each section is applicable. For example, often times the details of the diversion works are identified under both physical availability and adequate construction. They need to be under adequate construction. There shouldn't be a need to duplicate the information.

18. Don't put the Project Completion Notice deadline in a PDD. The Applicant cannot request a hearing on the deadline date.

Tips for Writing Findings of Fact:

- Not all of the information provided by an Applicant needs to be in the decision document, only the facts on which you based your decision.

- HB 831 - Applicant must provide a net depletion amount. However, mitigation must be for the amount of "adverse effect". Refer to the mitigation for adverse effect rather than net depletion.

- ~~The average rate of depletion is 0.013 percent of the lowest mean monthly flow in the Bitterroot River.~~ Don't include percentage of flow or volume statements. They may be factual; however, they are not facts used to make a decision. We don't want any misconception by the public that percent of flow or de minimis amount is a part of water law.

- The Applicant proposes to measure the flow rate and volume of water diverted for geothermal heating and cooling and will report these figures to DNRC on a yearly basis. (This can be inserted into the findings of fact and then a condition added to the document at the end.)

- If you agree with what is being said, state it as a fact. Make the statement a finding.

EXAMPLES OF HOW YOU SHOULD CRAFT FINDINGS OF FACT:

Not a Finding of Fact	Finding of Fact
The Applicant contributes this fluctuation was due to a change in the barometric pressure.	This fluctuation was due to a change in the barometric pressure.
According to the Applicant this pattern of minimal drawdown and no increase in drawdown as the test progresses is typical for an aquifer test performed in a highly productive aquifer where the pumping rate is relatively low.	This pattern of minimal drawdown and no increase in drawdown as the test progresses is predictable for an aquifer test performed in a highly productive aquifer where the pumping rate is relatively low.
I find the Applicant has adequately determined the zone of influence and identified the existing legal demands within such zone.	The Department finds the Applicant has adequately determined the zone of influence and identified the existing legal demands within such zone.
I concur with the Hydrogeologist determination.	Based on the information provided by the Department hydrogeologist, the Department finds the Applicant has addressed the requirements of the Hydrogeologic Assessment as required by § 85-2-360 and -361, MCA.
Drawdown interferences less than X will not ~~typically~~ prevent an existing groundwater user from reasonably exercising their water right.	Drawdown interferences less than X will not prevent an existing groundwater user from reasonably exercising their water right.
The Applicant presented sufficient documentation to justify water is physically available using a hydrologic model using precipitation events for small basins.	A hydrologic model using precipitation events for small basins showed the annual predicted runoff will provide X AF.
The existing annual volumetric demand was then compared with the natural flow through the aquifer across the zone of influence to determine if water is legally available.	The natural flow through the aquifer across the zone of influence is 8139.5 AF minus the existing annual volumetric demand of 2733 AF equals 5406.5 AF of water remaining in the aquifer.

The Applicant concluded that there is legally available water for this proposed application because there are no legal demands within the Applicant's delineated zone for the groundwater considered physical availability.	Water is legally available for this proposed application because there are no legal demands within the Applicant's delineated zone for the groundwater considered physical available.
The Applicant states that the nearest senior water user along the orientation of the fracture system is over three quarters of a mile from the zone of influence.	The nearest senior water user along the orientation of the fracture system is over 3960 feet from the zone of influence.
According to the Applicant, this pattern of minimal drawdown and no increase in drawdown as the test progresses is typical for an aquifer test performed in a highly productive aquifer where the pumping rate is relatively low.	This pattern of minimal drawdown and no increase in drawdown as the test progresses is typical for an aquifer test performed in a highly productive aquifer where the pumping rate is relatively low.
The system can be turned off at isolation valves where groundwater comes into each building allowing for the diversion to be shut off in the event of water shortage.	The Applicant's plan to prevent adverse effect is to turn off the system at the isolation valves where groundwater comes into each building allowing for the diversion to be shut off in the event of water shortage.
The information shows that water is available throughout the period of diversion.	X shows that water is available throughout the period of diversion. (X is the information.)
The Applicant states that 10,952 AF of water annually passes through the ZOI, and as a result it appears that approximately 13,048 AF/yr is over appropriated for this source.	Although 10,952 AF of water annually passes through the ZOI, and as a result it appears that approximately 13,048 AF/yr is over appropriated for this source (legal demand of 24,000 AF/yr minus 10,952 AF/yr of water physically available). However, water is legally available in this case since the proposed use is nonconsumptive.

Writing Standardization Table:

Statute Cite	▪ § 85-2-311, MCA (YEAR-for 1st citation only)

	▪ For first citation, include the year of which codes are being used. ▪ Multiple Sections - §§ 85-2-360 to -363, MCA
Rule Cite	ARM 36.12.1701
Statute and Rule Cite	§ 2-4-611, MCA, and ARM 36.12.211
Findings	▪ Use "the Department finds", however, if the finding is constructed as a statement, then neither phrase has to be used. *Example: The Applicant contributes this fluctuation to a change in the barometric pressure. You can use, the Department finds this fluctuation was due to … or preferably just say, This fluctuation was due to …*
Abbreviate	▪ AF ▪ CFS ▪ GPM
Always put a comma after a year	The hearing will be held on May 4, 2005, at …
One Word	▪ Groundwater ▪ Instream ▪ Prestream
Capitalize	▪ Department ▪ Applicant ▪ Objector
Don't Use *If you write the phrase, the Applicant …, then there must be a finding stating what you find about the information. (I find …) It's easier to state the factual information.*	▪ Only ▪ Just ▪ Should not ▪ It is unlikely ▪ Conservatively ▪ The Applicant says ▪ The Applicant determined ▪ The Applicant found ▪ The Applicant contends ▪ Percent of flow or volume
Use	▪ Use <u>aquifer flux</u>. Don't use volumetric flux; water flux, or ground water flux ▪ Department hydrogeologists ▪ Mitigate, not augment
Hyphens & Apostrophes	▪ No apostrophe in years (1970s) ▪ Use hyphen in modifiers (24-hour pump test) ▪ No hyphen - Nonconsumptive
Limit the use of prepositions	▪ of ▪ to ▪ in ▪ for ▪ with ▪ on
Adverse effect - noun	The appropriation causes adverse effect.

Adverse effect - adverb	The water rights will be adversely affected.
Domestic Use	Domestic lawn and garden if the WR is only for lawn and garden. However, code as lawn and garden. Domestic, which includes lawn and garden if the WR is for a house and lawn and garden.

Public Notice

This section covers the part of the Public Notice process that is done within the Regional Office while processing an application. All elements of the water right should be entered into the database exactly how we are proposing to grant it. Any conditions should also be entered into the database prior to sending to public notice (required by 85-2-307(2)(b)). General clarification remarks (associated remarks, II remarks) do not need to be included for public notice, although they can be included if you think they add clarity to the reader for the public notice. Supplemental remarks should be included for the public notice as they do add clarity to the reader. The only event left to enter into the database once the application has been sent to public notice should be an Issued event.

Public Notice Map

A public notice map must be created that shows the POD(s) for the application being noticed as well as all of the water rights that will be included in the notice list. The Notice Map should be at a scale that allows the entire project and the notice area to be viewed with adequate detail.

The Notice Map should follow the same general map guidelines described in ARM 36.12.111(1) including a north arrow, scale bar, section lines and numbers, etc.

The creation of the Public Notice Map and the Public Notice List are part of the same task and should be approached together with the notice area and the notice list in mind.

Preparing a Public Notice List

The notice list is a set of water right owners that may have interest in the application being noticed. Water right owners on this list will be sent individual public notice abstracts for the application being noticed. There is no set standard for how far away or how many water rights should be included with a notice list. However, there are several considerations that should be included in deciding on a list:

- It's best to over notice than under notice an application.
- Be aware of contentious situations on the source or in the area and include those likely to be concerned.
- The public notice should include appropriators who, according to the records of the department, may be affected by the proposed appropriation.

The extent of a public notice list depends on the region, population density, demand for water in that area and other local issues. The notice lists should always be discussed with the Regional Manager because of their knowledge of local water issues. The Department may also send a copy of the notice to other interested persons. For example, government agencies; private companies and consultants; persons with water reservations; Indian tribes with compacts; or persons who could be affected by an alteration in water quality may receive copies of the public notice.

Note: Keep in mind that many water rights can be owned by one person or entity. Don't assume because a list has dozens of water rights that it will represent more than a couple owners.
Once the public notice list is generated, create a public notice mailing list in the database by going to the "create and maintain" tab and selecting "mailing job" from the drop-down menu. The Mailing Job Number will be used to print labels for the public notice mailing.

Check the Public Notice Form

Review a copy of the Public Notice available from the database. The Public Notice abstract appears exactly how it will appear in the Newspaper and on the individual notices sent to people on the public notice list.

Have another Specialist or a Regional Manger review the Public Notice Form to ensure the following:

1. All the required information is included and correct
2. The notice is understandable
3. The notice describes the proposed application clearly
4. There are no spelling errors
5. The notice is concise with as few words as possible

Sending Public Notice to CO

After all the following is completed the public notice project can be sent to the Central Office to finish the process:

1. The notice area map is completed
2. The list of water rights to be notified is finalized
3. The elements of the proposed permit authorization are all entered into the database
4. Any proposed conditions are entered into the database
5. The water rights to be notified are entered into the database

Once all these steps are completed, email the `Application Number` and the `PD` to the Central Office public notice coordinator.

The Central Office public notice coordinator will prepare the public notice, arrange a notice date with a paper and mail the public notice out to the public notice list.

Public Notice Errors

If a there is an error found in the public notice after it's published; a new public notice is required. For example, a period of use less than intended, a purpose described that doesn't fully explain the complete use, or a significant land description error. Refining a POD or POU after public notice is acceptable and does not require a new notice, as long as the refined legal land description falls within the description on the public notice.

Errors by the Department

The Department will pay to re-publish a notice if the error was caused by the Department. Therefore, a meticulous review of the notice and application is necessary before publication.

Errors that do not Require a New Public Notice

Minor errors that do not affect the substance of the notice do not need to be fixed and re-published. Errors such as a misspelled water right number, basin or Applicant's name.

Data Entry

- Under the Events Tab add a PUBLIC NOTICE-SENT TO CO event and the date sent.

Finalizing the Permit Application File

After an application has gone through the Public Notice the Permit needs to be issued. The following are the general procedures for issuance.

- About 1 week after the Objection deadline has passed with no valid objections, the Central Office will send the PN packet back to the RO.
- Check the database to be sure the coding corresponds with the decision document, including any conditions or measurement requirements.
- Prepare the Final Order adopting the Preliminary Determination. The template is on the ROCO drive in the PD template folder. Make a copy of the signed Final Order for the file.
- In the Events Tab, make sure all applicable events have been entered. Also, enter the Issued event and the Project Completion Notice Due date.
- Print on legal size paper an ivory one for Applicant and a copy for the file (and copies for any consultants).
- Send copy of Adoption and ivory Permit/Authorization to the Applicant.
- Organize file for scanning.

Permit Authorization Document

The printed provisional permit on watermarked paper is the final document prepared for the application. It reflects how the permitted water right is to be used. It includes the following information:

- The assigned water right number and basin code
- a Completion Deadline and a date the project completion notice is due generated from Project Completion Notice Due event
- Standard remarks and conditions placed by the Preliminary Determination or the Final Order

- Two signature blocks
- Date Issued line from the Issued event

Print one copy of the Permit Authorization, sign it, and make a copy. Hole punch the copy, place it in the application folder in the appropriate place with a Permit/Authorization flag. Send the other copy to the Applicant with an "important notice" sheet and a 617 form with instructions. Any consultants should also receive a copy of the permit authorization.

Data Entry

1. Under the `Events Tab` add a `Project Completion Notice Due` event with the date the project completion notice is due.
2. Under the `Events Tab` add an `ISSUED` event with the date the provisional permit is printed.

File Organization and Documentation

Please keep in mind that you can look at and organize files (applications and materials) in whatever manner you like while you are working on them. The following file organization procedures must be completed prior to a file being moved on to hearings or to be scanned.

- All files end up being organized in the same manner to aid in consistency. When the public or Department staff is looking at the scanned documents it really helps to have things organized in a consistent manner such that content is located where you would expect it to be located and in a consistent order. Organization should not be changing from one scanned document to the next.
- A final version of Form 633 (and only the **final version** of Form 633) should be on a CD and attached to the application within the file
- (If the 633 is submitted by email, a final version should be copied onto a CD and attached to the file)
- All other application material submitted electronically, or processing information used by the Department in electronic format, should be printed out and put into the file
- Write on the front of the file – **Records: Form 633 information disc needs to be converted**
- The attached instruction flag (Form633_instructions_flag) should be attached to the front of the file
- Upon issuance, denial, termination, etc.... or request, the file must be routed to the Records Unit for scanning

Form 633 instructions

The Form 633 instructions and flag can be found in the following location: G:\WATER_RT\ROCO FOLDER\FILE ORG & FLAGS\FLAGS

Files as Legal Documentation

Water rights files are legal documents. Maintaining water right files in good order includes documenting every substantive communication or reason for a change in the file. A good rule of thumb is to imagine that you are on the witness stand in five years regarding this water right file – what information would you need to defend all the actions taken with regards to the water right file? If you have a stellar memory, imagine your successor on the witness stand having to defend every action the Department took with regards to the file. Imagine a coworker will have to review this file in the future due to a filed change application – you want your coworker to know exactly what went on in that water right file (and to be thinking complimentary thoughts of you while reviewing your work!). Erring on the side of caution and documenting when in doubt is good practice.

Some ways to document different file actions are explained. For form/document changes, make a copy of the form, clearly stamping "WORK COPY" on the form. On this clearly noted copy, make any changes and document why you are making those changes. Always initial and date the noted changes on this work copy, as others may work on this file after you. An example might be a purpose clarification you received on a phone call, note the date, time, name of person, along with the purpose clarification information. If you are adding paper to the file, make sure to document that DNRC provide that information to the file. If something comes in later from an Applicant, make sure a date received stamp is on the paper, indicating that the document was received after the original form.

If you are having a meeting or an extended conversation with a party to the water right file, consider using a memo format to document what was said during the meeting. You might consider multiple documentation, if, for example, the meeting resulted in form changes. One could have a memo documenting all the content in the meeting along with a work copy of a form noting a clarification or change resulting from that meeting.

Any substantive email or letter correspondence needs to be copied to the file. One can easily forget to include emails in water rights files, so attempt to include them right away upon receipt or after a thread exchange is completed. DNRC also has some templates for documenting multiple phone contacts (created for complaint process) that one could use if applicable in other water right situations.

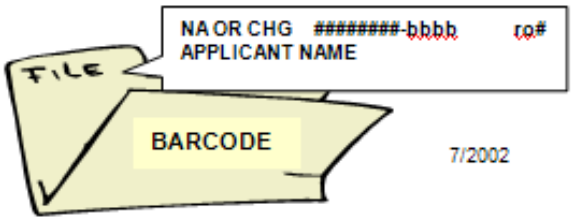
In larger water right files, one can consider creating a custom file flag for unique situations. If you have a special circumstance where file organization might benefit from a customized section, consider creating a custom flag to represent material that doesn't fit the typical flag sections.

Methods exist to correct errors in DNRC documents in the file. If a technical report has been finalized and then later calculations are changed, this should be documented in some manner. A regional manager might have a preference, but some ways include a dated work copy, a written memo, an explanation in the decision document, or an explanation or correction in a final order (the nature of the change will help dictate the level of the documentation).

File Organization

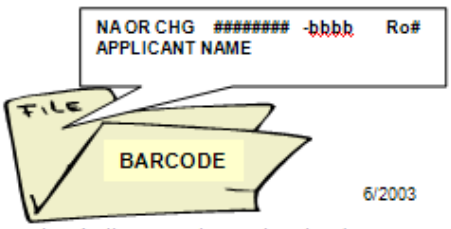
The following file organizational charts show how to organize a file for records scanning. There are two organizational structures depending on if the folder is a single folder or multi-tab folder.

NEW APPROPRIATIONS
FILE ORGANIZATION CHART



RCO = Reverse Chronological Order (earliest dated document on bottom, most recent on top.)

LEFT SIDE/TOP TO BOTTOM	RIGHT SIDE/TOP TO BOTTOM
MEASURING & PROGRESS REPORTS All measuring device or progress reports	**VERIFICATION/CERTIFICATION** All materials Draft Certificate or All-Purpose Abstract Verifab 617/618 Field Report (Post 4/14/92 NOC) Questionnaires (Pre 4/14/92 NOC) Maps & Photos NRCS "as built" form Well Log Correspondence - RCO
EXTENSION/NOC/REVOCATION Official Revocation Form Project Completion Form Extension – Notice of Action Extension Form Extension – Reminder letter Correspondence	
HEARINGS INFO/CORRESPONDENCE All materials should be placed in RCO Orders, except final order Notices Proposal for Decision Motions Appointment of Hearing Officer & Discovery Order	**PERMIT/AUTHORIZATION** Permit/Authorization Final Order Criteria Assessment
OBJECTIONS/CORRESPONDENCE All in RCO Request for Hearing Objector List Withdrawal Forms Standard Central Office Objection Letters Objection Forms w/ objection determination form placed with the respective objection	**APPLICATION MATERIALS** Work Copy Original Application Criteria Supplement Evidence Well log General Correspondence
	MAPS Any and all maps except for the Notice Area Map
PROCESSING FORMS/PUBLIC NOTICE Waiver 612 (if no objections received) Public Notice Notice Area Map Form Checklist Environmental Assessment PN Bill and Tear Sheet Affidavit & Certification of Publication PN Letters to Applicant & Newspaper Certificate of Service PN Return Mail	**EXISTING RIGHTS** Associated Flag Copies of Associated Water Rights
	FIELD INVESTIGATION Field Investigation Report
OWNERSHIP UPDATES Ownership Update Information	



NEW APPROPRIATIONS

FILE ORGANIZATION CHART - MULTI TAB FILES

6/2003

Left to Right and RCO = Reverse Chronological Order (earliest dated document on bottom, most recent on top.)
When the multi-tab folder is full, start another multi-tab folder. Label the folders the same and then on each folder put "File? of ?".

INSIDE COVER	1ST TAB - FRONT TOP TO BOTTOM	1ST TAB – BACK TOP TO BOTTOM Use however many tabs are needed.	FROM THIS POINT FORWARD, EACH SECTION SHOULD BEGIN ON A NEW TAB
PERMIT/AUTHORIZATION Permit/Authorization Final Order Criteria Assessment **APPLICATION MATERIALS** Work Copy Original Application Criteria Supplement Evidence Well log General Correspondence **MAPS** Any and all maps except for the Notice Area Map **EXISTING RIGHTS** Associated Flag Copies of Associated Water Rights **FIELD INVESTIGATIONS** Field Investigation Report	**PROCESSING FORM /PUBLIC NOTICE** Waiver 612 (if no objections received) Public Notice Notice Area Map Form Checklist Environmental Assessment PN Bill and Tear Sheet Affidavit & Certification of Publication PN Letters to Applicant & Newspaper Certificate of Service PN Return Mail	**OBJECTIONS /CORRESPONDENCE** All in RCO Request for Hearing Objector List Withdrawal Forms Standard Central Office Objection Letters Objection Forms w/ objection determination form placed with the respective objection	**HEARINGS INFO /CORRESPONDENCE** All materials should be placed in RCO Orders, except final order Notices Proposal for Decision Motions Appointment of Hearing Officer & 1st Pre-Hearing Order **OWNERSHIP UPDATES** Ownership Update Information **MEASURING & PROGRESS REPORTS** All measuring device or progress reports **EXTENSION/NOC REVOCATION** Official Revocation Form Project Completion Form Extension Notice of Action Extension Form Correspondence **VERIFICATION/ CERTIFICATION** All materials Draft Certificate or All-Purpose Abstract Verifab 617/618 Field Report (Post 4/14/92 NOC) Questionnaires (Pre 4/14/92 NOC) Maps & Photos NRCS "as built" form Well Log Correspondence - RCO

Flags

File flags are used to divide application and file content as shown in the organizational structures above. You can find the flags that are available to be used on the ROCO drive. You will find that the flags in that folder are in PDF format and cannot be edited. If you would like to alter a flag or create a new flag, please contact the CO staff so the master flag can be updated and statewide staff made aware of the change. Existing file organization structure must also be considered.

PD Naming Standards & Posting Information

When you post a PD on ROCO, please name it using the following standard:
Form Number_GW/SW_Grant/Deny/Modify_Basin & Number_Last Name
Example: **606-IR_SW_Grant_38H 30105555_Jackson**
Upon ADOPTION, the PD should be posted in ROCO\DECISION DOCUMENTS\PRELIMINARY DETERMINATIONS\Finalized PDs By Ros\Your Office. Each office is responsible for posting PDs on ROCO. If the application is finalized by the hearings unit / CO, CO staff will post the PD, if applicable. CO will update the PD finder occasionally. All PDs that are in the proper spot on ROCO will be loaded into PD Finder and then moved to ROCO\DECISION DOCUMENTS\PD Finder\PDFs .

Purpose Specific Considerations

Domestic

ARM 36.12.115(2) identifies the standard for domestic use at 1 AF per household. This value is used as a maximum value in issuing a Certificate of Water Right and can be used to calculate the volume of a Provisional Permit. More precise, (and typically lower), values for domestic use can be found in Montana DEQ Circular #3, (Standards for Small Water Systems) and the Planning Guide for Water Use, (New Appropriations form 615). The Department should default to the DNRC standard. If the Applicant wishes to use a value differing from the DNRC standard, they must provide the extra information and also explain why it is appropriate.

If more than one household is identified on the application, the purpose is identified as Multiple Domestic. Multiple Domestic rights are typically sub-divisions where the water right is held by a homeowners' association. A Multiple Domestic water right has the same water use standards as Domestic rights, (i.e. 1 AF per household). If there are greater than 15 service connections the application will be for a minimum of two wells as a redundant well is required. See ARM, Title 75, Chapter 6 (Environmental Protection, Public Water Supplies, Distribution, and Treatment).

When calculating the volume associated with domestic use in a change application the Department will utilize any and all information available in order to most accurately identify the exact amount of historical domestic use taking place. This might involve the looking at historical aerial photos and counting the number of homes on the photo(s) as well as associated lawn and garden acres. If you have questions concerning how best to approach calculating domestic volumes on a change contact the Central Office.

Helpful References, (links):

- ARM 36.12.115
- Montana DEQ Circulars – DEQ 3, (Standards for Small Water Systems)
- Planning Guide for Water Use – Form 615
- Title 75, Chapter 6 MCA – Public Water Supply

Fire Protection

Water for temporary emergency fire protection does not require a water right from DNRC. If water is to be stored for fire protection and the storage impoundment exceeds .1 AF (the place of storage definition, ARM reference), a water right may be required. Generally speaking, if evaporation is expected to occur from the storage reservoir, a water right is required. If any water appropriated for fire protection is to be used for activities other than emergency firefighting (such as practice firefighting or washing equipment), a water right is required.

Montana Code Annotated Reference: § 85-2-113(3) The Department shall adopt rules providing for and governing temporary emergency appropriations, without prior application for a permit, necessary to protect lives or property.

Administrative Rules of Montana Reference: 36.12.105 Temporary Emergency Appropriations 1) A temporary emergency appropriation may be made without prior approval from the Department, but the use must cease immediately when the water is no longer required to meet the emergency. 2) A temporary emergency appropriation does not include the use of water for the ordinary operation and maintenance of any trade or business.

Beneficial Use for actual firefighting is typically difficult if not impossible to quantify. Generally speaking, the volume required is that of the storage capacity plus evaporation and any additional water used for non-emergency use.

*Special Note: The Form 647 is available for governmental fire agencies to record a water right for fire protection. See the form for specific information.

Geothermal

Applications for water use for open loop Geothermal Cooling and Heating can be filed on three different forms depending on the amount of water required for the specific system. Whichever form is used both a flow rate and a volume must be coded on the individual water right.

- Form 602 - For systems where the combined water use for all listed purposes is less than 35 GPM and 10 AF
    - 6.2 GPM year-round use = 10 AF
- Form 646 – For systems where the flow rate is less than 350 GPM
- Form 600 – For systems where the flow rate is greater than 350 GPM

Geothermal heating and cooling systems are either closed or open loop systems. A closed loop system works by digging a series of holes in the ground and running pipes filled with water and antifreeze in them. The water and antifreeze is then circulated in and out of the house in a closed system. Even a closed system requires a water right assuming the water is being diverted and not coming from an existing community system. An open loop geothermal system requires a water right.

Open loop geothermal appropriations of up to 350 GPM are potentially exempt from the permitting process if they meet all the requirements of 85-2-306 (3)(ii) MCA and can be completed on Form 646. See the Form 646 for more details. If the pumping rate exceeds 350 GPM (or for flow rates below 350 which do not fit the requirements of a 646) a permit is required for the extraction well.

Open loop geothermal systems are non-consumptive in nature. Special consideration must be given to the location and depth of extraction vs. injection well. Is the water injected into the same aquifer from which it is extracted? Even though the use is non-consumptive over the long haul, a neighboring well could be adversely effected if the cone of depression of the extraction well has more a more pronounced effect on another well than the mounding created by the injection well (i.e. the injection well is much deeper than extraction or injection well is located much further away from the extraction well than the neighboring adversely affected well is located). It is possible that extraction can cause a reduction in nearby streamflow that the injection will not offset completely; therefore, adverse effect will need to be addressed on that surface source. This information and more should be identified in the WMB report.

Hydropower

Hydropower permits can be consumptive or non-consumptive and may or may not include storage. A Hydropower project which does not have a diversion and does not include storage is referred to as "run of the river".

FERC Licensing (Federal Energy Regulatory Commission)

Hydropower projects almost always involve a FERC license or exception. The State of Montana cannot require a State based water right for a FERC hydropower project or exception, though Montana and/or the appropriator can protect existing water rights. Hydropower is a beneficial use under 85-2-102(4)(a) MCA, and thus a hydropower project may get a state based water right in order to protect the amount of water required for the project.

Micro Hydro

Is a catch-all term for small scale hydropower. Presently it is not treated any differently than other hydropower under Montana Law, but it demands certain considerations because of its small size.

- For a permit, Micro Hydro proceeds as any other permit. Remember, adverse effect of a non-consumptive use is usually a result of a change in the timing of flows. If a use is truly non-consumptive then adverse effect must be limited to the effects of the diversion required by the micro-hydro. Not all micro-hydro systems are non-consumptive. Some systems may require small storage reservoirs (which may or may not be enclosed). If there is an open reservoir, evaporative losses must be calculated as with any other consumptive water right.

Nonconsumptive Hydropower

Nonconsumptive use means a beneficial use of water that does not cause a reduction in the source of supply and in which substantially all of the water returns without delay to the source of supply, causing little or no disruption in stream conditions (85-2-102(19), MCA). Typical Micro Hydro systems, or "run of the river" systems, probably qualify as nonconsumptive as do permits bootstrapped onto existing uses and conditioned on operation in accordance with the preexisting permit. Conversely, any hydro with an impoundment or non-enclosed diversion works probably does not fit within the definition of a nonconsumptive use. Pipeline diversions have been accepted if it can be show that there is no adverse effect and water is legally available between POD and the discharge point.

Nonconsumptive Hydropower Use and Basin Closures

Some basin closures have a nonconsumptive exclusion for hydropower while others do not. Listed below are the basin closure exceptions for hydropower found in the Montana MCA:

- Bitterroot River Basin Closure has NO exception for nonconsumptive use MCA 85-2-344 MCA

- Upper Clark Fork River Basin Closure, there is no nonconsumptive exclusion in the upper Clark Fork Closure. However, one may expand existing hydropower projects as long as consumption is not increased. 85-2-336(2)(f) *MCA.*
- Jefferson River, Madison River Basin Closures, nonconsumptive new permits are OK. 85-2-341 MCA.
- Teton River Basin Closure, nonconsumptive new permits are OK. 85-2-330(b) MCA.
- Upper Missouri River Closure, nonconsumptive new permits are OK. 85-2-343 MCA.

What to do in a Closed Basin?

If there is an exception for nonconsumptive use, then a new permit is the most logical option for run of the river hydro. If it is piggybacked on an existing use (say the diversion for an irrigation right) then remember that the new permit must be conditioned upon the operating conditions of the existing water right in order to fit the definition of nonconsumptive or to avoid adverse effect.
If there is no exception for nonconsumptive use or a new permit will create adverse effect the appropriator must rely on a change. In order to retain a priority date and avoid adverse effect, water is available for a new purpose only when water is removed from the existing purpose. For example, irrigation water may be changed to fill and maintain a fish pond only when water is removed from irrigation.

Industrial

The Department typically considers industrial purposes on a case by case basis. Ultimately, it must be shown that the amount of water necessary for the industrial use is necessary to accomplish the beneficial use.

Mining

In determining whether or not a mining activity requires a water right, remember that the key is whether the mining diverts or withdraws water, not necessarily what the miner does with that water.

Most commercial placer mining and technologically advanced recreational mining relies on the diversion and withdrawal of water. Remember diversion for non-consumptive uses still requires a water right, for example gravel wash plants and pipeline pressure testing. There is no de minimis exception in Montana water law; some of the oldest water rights in Montana are very small water rights associated with placer mining. In fact, one Montana mining water right dating to 1874 is for 1.85 gal/min, and there are hundreds of Montana mining water rights with flow rates less than one cubic foot per second.

Gold Panning

Extracts gold by mixing water with gravels and separating the water and gravel from the gold. Panning is typically done while standing in or at the edge of the water. Essentially the miner is dipping up water and sloshing it in the creek, the water is not diverted or withdrawn, rather the pan is typically partially submerged during the panning process. Gold panning does not require a water right.

Sluicing

Is the use of a "sluice box" in a creek to separate gold from gravels? A sluice box is a metal, wood, or plastic channel that has "riffles" and other devices in it to catch gold. The sluice box is placed in the water with the entrance of the box upstream, so water flows through the box. Gravels are shoveled into the top of the box where water enters. Sluice boxes in their traditional form are placed in the creek channel and use the natural

flow of the creek to wash gravel. It follows that there is no diversion of water in using a sluice box in the creek, and no water right would be required.

Dredging

Is the use of a suction dredge to "vacuum" gravels off the bottom of a creek? A dredge is the combination of a pump and a sluice box either placed on the creek bank or mounted on floats. An engine-pump combination is either mounted on the floats with the sluice box, or placed on the shore. High pressure water from the pump travels through a hose creating suction in a vacuum hose, and the suction developed is sufficient to suck up gravels. The gravel and water travel through the suction hose up to a sluice box. Unlike the traditional use of a sluice box, the water from a suction dredge is physically pumped from the bottom of the stream through a hose and into the sluice box. Thus, the suction dredge is by its very nature a diversionary device, pumping water from the stream into a sluice box. If the sluice box is placed in the river channel then although the water in the suction dredge discharge hose has been redirected, it has not been diverted from the stream itself, and operation of a suction dredge would not require a water right. If the dredge discharge hose leads to a sluice box on the bank or otherwise placed outside of the actual river channel, then the dredging is a diversion, and would require a water right.

High-Banker

Is a sluice box with a hopper mounted on one end into which the miner shovels gravel? A pump draws water from the stream into the sluice box and washes the ore, discharging washed gravel and water at the end of the sluice. High banking is also called "power sluicing" because it imitates the action of stream water in the sluice, but enables the miner to work more efficiently by diverting operations to the stream bank or other work site. The high-banker withdraws and diverts water out of the stream by its very nature, and thus requires a water right.

Marketing

The Marketing purpose is used any time water is offered for sale to end users that are not the Applicant with a few exceptions (in the past, this was known as Sale). The exceptions are municipal and marketing for mitigation (see special sections for information on those purposes).

There are special statutory requirements for all marketing applications. Per 85-2-310(9)(v)(D), MCA, marketing applications require the submission of contracts to prove a bona fide intent to perfect the water right. Without contractual agreements, the use is considered speculative. **DNRC requires firm contractual agreements for all of the water that is to be marketed.** You will need to get these contracts prior to being able to deem an application correct and complete.

The water should be for use in Montana only, unless the Applicant has addressed the out of state criteria in the application (85 -2-311(4) MCA).

If the water is intended for a water depot then access to the depot facility should be controlled so only people with valid purchase contracts may obtain water. Conditions regarding these issues may be added to the water right if deemed necessary.

There are special COLs for water marketing PDs, contact CO or the Glasgow office for this language.

For database coding purposes, the point of sale is the place of use. The service area is the location where the water is actually to be used. Possessory Interest must be proven regarding the point of sale/place of use, not

the service area. You may enter a place of use information remark listing the service area if you wish. Depending upon the nature of the marketing situation, the service area may be a specific section or as large as several counties.

A CD may apply for a water marketing permit. If the CD chooses to apply for water marketing instead of irrigation, the CD must meet the same requirements as any other Applicant with respect to marketing. Additionally, if they are using their water reservation, a change of purpose is required and this change must meet the requirements of 85-2-316 MCA.

A note on Extensions & Project Completion for Marketing:

→ Prior to the Atlantis District Court decision dated August 1, 2016, water marketing applications were permitted based on letters of intent to contract at least 50% of the requested volume rather than firm contracts. Following the Atlantis decision, firm contracts were required for the entire requested volume before an application could be considered correct and complete.

Extension

To receive an extension, the facility must be built and water use measurements must be provided, regardless of when the permit was issued.

For permits issued prior to the Atlantis Decision, copies of all contracts must be submitted. The contracts must identify the maximum volume of water being purchased. The combined total volume of all contracts must be equal to or greater than 50% of the permitted volume to show diligence. Maximum yearly measurement records can be less than 50% of the permitted volume. No credit towards completion will be given for diverted water in which no contract is provided. To control speculation only one extension will be granted and the extension period cannot exceed 5 years. If copies of contracts are already in the file from a previous progress report for the maximum year, they do not have to be submitted again.

If the Permittee files an Extension and later finds out they must file a Project Completion Notice, the filing fee for the Extension will be refunded.

Project Completion Notice

For permits that were received prior to the Atlantis Decision, measurement records and contracts are needed because letters of intent to purchase water were accepted at the application stage. For permits received after the Atlantis Decision, only measurement records are needed because contracts were required at the application stage and are in the file.

Mitigation/Aquifer Recharge

It is possible for a permit application to come in for mitigation or aquifer recharge. This will likely be limited to situations in which a basin closure is in place but there is an exception to the closure for high spring flows. A permit for mitigation or aquifer recharge in this situation will be paired with either a permit for groundwater which is depleting a surface water source outside of the high spring flow or potentially a change application which may need to be mitigated and storage of the high spring flows is used for mitigation.

Municipal

Municipal use means water appropriated by and provided for those in and around a municipality or an unincorporated town. Municipal use water rights can be held by municipalities, unincorporated cities and towns, water and sewer districts, or other entities. Municipal purpose should not be used by individuals, regardless of the number of purposes on a water right. For example, a rancher should not have a municipal water right even though he/she may have a water right for domestic, lawn & garden, stock, and irrigation. Those purposes should be individually identified on the water right.

The municipal purpose may be used any time an entity owns a water right for multiple purposes which could be construed as municipal in nature. Typically, municipal rights have domestic, lawn & garden, and commercial/institutional/industrial purposes but could include any other purposes such as water marketing, irrigation, stock, mining, etc.

Municipalities

A municipality is an incorporated city or town organized and incorporated under Title 7, chapter 2. Additionally, the Department considers unincorporated towns as a municipality outside of a closed basin. Municipalities may own any type of water right used for any purpose (i.e. a municipality may own water rights for purposes other than municipal). A municipality or other entity may own a water right for a municipal purpose which can essentially be used for anything. If the municipality owns water rights for specific purposes, those water rights may only be used for the purposes identified.

There is no growing cities doctrine in Montana. Municipalities must own water rights in the same fashion as an individual to legally appropriate water. A municipality may not exceed any element of its water rights at any time, regardless of boundary changes, population growth, etc.

Notes:

- If the municipality would like to reuse wastewater, the Applicant will submit a copy of the DEQ application and DNRC will evaluate the proposal to see if a new permit would be required. Generally speaking if the reuse is part of treatment, a new permit will not be required; however, if treatment of the water has concluded and it is going to be once again beneficially used rather than discharged, a new permit would likely be required.
- If a municipality owns an older water right for a diverted volume, and the DEQ mandates a change in effluent treatment that requires more consumption, a new permit is not required.

Stock

ARM 36.12.115 identifies a standard diverted volume for stock use at 15 gallons per day or .017 AF per year per animal unit. Note that stock use is considered 100% consumptive and thus consumptive volume equals diverted volume. Animal units are defined in ARM 36.12.101 and in the water conversion table, (form # 615). It is important to note that a Statement of Claim was issued based on 30 gallons per day per animal unit or twice the volume used in the permit process.

Ponds

*The application process for on-stream stock water pit or reservoir that retains 15 AF or less of water from a non-perennial source can be done using a Form 605 with a fraction of the detail required for a permit and a lesser cost. All other stock reservoirs require a standard permit. If a permit application is submitted for a storage reservoir/pond which has a 605 permit already issued for it, the Applicant will have to withdraw the 605 before the permit can be issued. If they wish to keep stock use of the pond, the volume required for the stock use can be included as part of the requested volume of the permit. The reason the 605 needs to be withdrawn is that 605 permits are an exception to the permitting process which are for stock use only and they are issued for the capacity of the reservoir/pond multiplied by the number of annual fills of the reservoir/pond. This completely ties up the use of the reservoir/pond for stock use only and the only way to make water available again for appropriation at the reservoir/pond is to withdraw the existing right tying up all the water.

Under 85-2-312 MCA the DNRC may issue a permit only for that amount of water that can be beneficially used without waste for the purpose stated in the application. The requested volume will include that amount consumed by stock plus the evaporative loss (which typically makes up the majority of the requested volume). Evaporation is calculated per the Department's Technical Memorandum: Pond and Wetland Evaporation/Evapotranspiration, dated March 14, 2018.

Another method to determine an appropriate volume for the requested purpose can be found using the USDA Field Manual, Chapter 11 Ponds and Reservoirs. This publication describes the minimum dimensions for a reservoir to provide year-round water.

If the appropriation is for a reservoir where the impounded volume exceeds the volume that can be put to a beneficial use an allowance for carryover water can be incorporated into the beneficial use. Guidelines for the extent of this carryover volume do not currently exist. If the application requests a volume that far exceeds the reservoir volume then the decision should be to deny absent of further justification from the Applicant.

Additional Considerations if ponds are involved:

- Hazard Classification – To build a new dam or alter an existing dam, (either of which an impoundment capacity of 50 AF or more), you must apply to the DNRC Dam Safety Program for a hazard classification.
- Drainage Device – Where it is likely that senior water rights will be affected the ability to drain the reservoir is necessary.
- Existing water rights – Check for existing rights on the subject reservoir. Do the numbers match? Was the dam verified?
- Estimation of Evaporation from Shallow Ponds and Impoundments in Montana
- Pond Evaporation
- USDA Field Manual, Chapter 11 Ponds and Reservoirs

Reservoirs

See ponds section above.

Entity Specific Considerations

Municipalities

Municipality means an incorporated city or town organized and incorporated under Title 7, chapter 2.

A municipality is different than using water for a municipal beneficial use. See below to learn more about municipal use.

Water & Sewer Districts

Water and Sewer Districts—which comes first: permit or boundary expansion?

Water and Sewer Districts are unique and are not considered municipalities. They are governed under MCA Title 7, Chapter 13 and each district has a unique set of articles of incorporation which further dictate how the body must operate. That said in order to address the possessory interest criterion in a permit application, water and sewer districts need at a minimum written permission from the landowners within the proposed place of use. Upon perfection of the permit it must be shown that the water and sewer district is utilizing the water in the proposed place of use. This could be accomplished by showing an expanded boundary, providing proof of hookups, or providing contracts with users within the place of use.

Home Owners Associations

Home Owners Associations (HOAs) need to be registered with the Secretary of State (SOS) in order to be able to complete a water right application. All business entities must be filed with the SOS in order to exist as a legal entity and transact business. Therefore, a HOA that has not properly formed under the laws of Montana is not a legal entity. DNRC can't transact business with any business entity that is not in good standing with SOS because any signature is suspect and likely invalid. The Board of Directors, its officers and its existence must all be in good standing to function as an entity. You can relate this concept with issuing a 602 to a dead person.

Subdivisions & Municipal Use

Multiple domestic use means a domestic use by more than one household or dwelling characterized by long-term occupancy as opposed to guests. Examples are domestic uses by:

- Colonies
- condominiums
- townhouses
- subdivisions

Municipality means an incorporated city or town organized and incorporated under Title 7, chapter 2.

Municipal use means water appropriated by and provided for those in and around a municipality or an unincorporated town.

Multiple Domestic or Municipal Use - Typically a subdivision with a common water supply has a Multiple Domestic Use. A Municipal use for a subdivision is appropriate when there may be three or more uses such as domestic, irrigation, and commercial use on the water system.

Phasing – Many subdivisions are phased, meaning the entire area is planned out but not platted. This allows the developer to use the proceeds from each phase to finance the infrastructure needed for only that portion of the subdivision. As each phase is built and perfected, the Developer applies for a new separate water right, with a flow rate, volume, and POU appropriate to that buildout. When the subdivision is finished the water can be comingled and can be used on any lot in any phase as long as all phases are covered under at least one water right.

Memos & Policies

Note that all the Memos & Policies contained in this document can also be found in the ROCO folder in the folder named "MEMOS & POLICIES & OPINIONS".

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Technical Memorandum: Physical and Legal Availability of Ground Water

Date: April 22, 2019

To: Administrator, Water Resources Division

From: Water Management Bureau

The purpose of this memorandum is to describe standard practices followed by DNRC to evaluate legal availability in the amount requested during the period of diversion for permits to appropriate ground water under §85-2-311(1)(a)(ii), MCA.

Legal availability, whether for an appropriation of ground water or surface water, is determined by analyzing physical availability, identifying legal demands on the source of supply throughout the area of potential impact, and comparing the physical water supply at the proposed point of diversion with the legal demands on the supply. ARM 36.12.1704 specifies procedures for evaluating existing legal demands and ARM 36.12.1705 specifies procedures for comparing physical availability and existing demands. ARM 36.12.1704 specifies procedures for evaluating physical ground water availability criteria under §85-2-311(1)(a)(i), MCA; however, different procedures are used to evaluate the physical water supply for evaluations of legal availability of ground water.

Legal availability of ground water is an evaluation of whether the physical supply at a proposed point of diversion is adequate to meet current as well as additional demands. For surface water, physical availability for comparing to legal demands is based on flow, specifically the median of mean monthly stream flow. That practice also has been followed for ground water applications where ground water flow or flux, ground water recharge, and ground water discharge are alternative metrics for physical supply transmitted through a ground water system. Selection of which metric to use depends on the hydrogeologic setting and available information to complete a calculation.

A technical evaluation of legal availability of ground water requires information on the area of potential impact and physical availability within that area. Legal demands within the area of potential impact are compiled from the water rights database.

Area of Potential Impact

The standard approach for delineating the area of potential impact to evaluate legal availability of ground water under §85-2-311(1)(a)(ii), MCA is to calculate the extent of drawdown from pumping for the period of diversion with an analytical model and inputs from an aquifer test. A zone of influence (ZOI) is most often delineated from a distance-drawdown plot produced using an analytical model such as the Theis (1935) solution, a constant pumping rate for the period of diversion, Transmissivity and Storativity from an aquifer test of a proposed well. The result is generally a circular area known as the zone of influence which is defined by the 0.01-foot drawdown contour that is truncated at aquifer boundaries.

Physical Availability

Physical availability within the area of potential impact can be evaluated by estimating 1) ground water recharge, 2) ground water flux, or 3) ground water discharge.

Ground Water Recharge

Calculations of ground water recharge must be based on credible measurements of stream losses or a modeling investigation to provide reliable estimates of the physical ground water supply for comparison to legal demands. An estimate based on percent of precipitation or another rule of thumb are unreliable and generally are not accepted. One example of an evaluation of stream losses to estimate ground water recharge is a study of recharge to the Madison Group aquifer in central Montana by Feltis and Shields, (1982). An example of an investigation where recharge was estimated as part of a modeling investigation is work by Briar and Madison (1992) where recharge was estimated from measurements of streamflow and ditch losses, estimates of deep percolation of irrigation water, and calculation of ground water inflow.

Scale is an important factor that must be considered when characterizing the physical supply for comparison to legal demands from estimates of ground water recharge. Recharge estimates must be tributary entirely to the ZOI or be amenable to apportioning to a smaller ZOI to be a credible measure of the physical supply.

Ground Water Flux

Ground water flux (Q) through a ZOI corresponding to the 0.01-foot drawdown contour is calculated from Darcy's Equation:

$Q = Twi$, where:

- T = Transmissivity (ft^2/day)
- w = Width of Zone of Influence (ft)
- i = Ground Water gradient

Example: Irrigation well in unconfined alluvium in Richland County Montana

The ZOI extends beyond aquifer boundaries and is subsequently truncated at the boundaries for the purpose of determining aquifer flux. The width of the ZOI then determined from the distance between the boundaries perpendicular to the gradient.

T = 20,490 ft^2/day from applicant's aquifer test
Width = 6,200 ft, distance between boundaries perpendicular to gradient
i = 0.001 from ground water levels in wells

Q = (20,490 ft^2/day)*(6,200 ft)*(0.001) = 127,038 ft^3/day = <u>1,064 acre-feet/year</u>

<u>Ground Water Discharge</u>

Discharge of ground water to surface water base flow can be calculated from Base Flow Index (BFI) information from the USGS. Two pieces of information, annual flow and BFI, are required when using this method to determine the annual quantity of ground water that contributes to the baseflow of streams within the contributing watershed area of a proposed new well, pond or pit. This annual value will be used to evaluate the physical ground water supply for comparison to existing legal demands. BFI values that represent the ratio of base flow to total annual flow are estimated by the USGS using automated hydrograph separation and are available for many historic gage sites across Montana (Wolock, 2003-146). Where no gage exists, or for sites that are influenced by reservoir storage, BFIs can be estimated from an interpolated grid of BFI values (Wolock, 2003-263).

When possible, the BFI's taken from a gage site are preferable, provided the gage site is free of reservoir effects that can lead to overestimation of baseflow contribution. Gridded BFI maps that are interpolated from gaged information should be substituted when reservoir effects are expected to be significant.

Example: Ground water pit/pond in unconfined alluvium in Lincoln County

The initial investigation of physical availability resulted in a relatively small ZOI, which taken in combination with the aquifer properties and hydraulic gradient, indicated that there was insufficient flux to maintain the pond, or any additional groundwater rights. However, the persistence of water in the pond, it's construction within the shallow alluvial aquifer, and the hydraulic connection of the shallow aquifer to the Fisher River all provided contrary information suggesting that water was physically available. Given this, and the limited and well defined extent of both the aquifer and watershed drainage area (encompassing the pond and the downstream depleted reach) the Department investigated physical availability of

groundwater at the local watershed scale using an estimate of annual flow at a point in the Fisher River and an appropriate BFI.

The appropriate regression equation for the ungaged location on the Fisher River provides an estimate of 335 cfs (242,112 acre-feet/year) for the mean annual flow. A representative BFI of 0.727 value is from representative data from HUC 8 level gage on the Fisher River near Libby (USGS 1230255).

Contributing watershed: Upper Fisher River HUC 12 (489.3 square miles)
Precipitation: 28.6 inches

Mean annual streamflow = 335 cubic feet per second (242,112 acre-feet/year)
BFI for Fisher River HUC 8 = 0.727

Physical supply = 0.727 x 242,112 acre-feet/year = 176,014 acre-feet/year

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Technical Memorandum: Estimation of Runoff Volumes for Ephemeral Drainages in Eastern Montana

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Technical Memorandum: Estimation of Runoff Volumes for Ephemeral Drainages in Eastern Montana

Date: October 7, 2019

To: Millie Heffner, Water Rights Bureau Chief

From: Dave Amman, Hydrologist, Water Management Bureau
James Heffner, Hydrologist, Water Management Bureau

Background

As part of the water right permitting process, DNRC has long struggled with calculating reasonable estimates of annual runoff and monthly flow characteristics from ephemeral streams in small drainages, particularly in eastern Montana.

By definition, ephemeral streams flow only in response to snowmelt or precipitation events which exceed the infiltration rate of the soil surface. Few ephemeral streams have been gaged, and methods derived to estimate flow characteristics of perennial or intermittent streams are not applicable. Over the past few years, the Water Management Bureau has examined several potential methods which might be used to estimate annual runoff and monthly flow characteristics for ephemeral drainages.

One such method includes a monthly water balance model created and then refined by the USGS. The USGS Monthly Water Balance Futures Portal (Portal) is basically a refined and repackaged version of their previous water balance model, referred to here as the Thornthwaite program. The Portal uses regional calibration instead of national, and incorporates seasonal adjustments for temperature and precipitation, thereby providing perhaps more accurate runoff estimates for eastern Montana.

USGS Monthly Water Balance Model Futures Portal

The Monthly Water Balance Model Futures Portal (https://my.usgs.gov/mows/) appears to be a reasonable method for estimating annual runoff from ephemeral streams in small watersheds.

The Portal derives estimates of runoff using the Monthly Water Balance Model (McCabe and Markstrom, 2007) with hydrologic and climatic inputs indexed to features in a geospatial dataset used for hydrologic modeling (Viger and Bock, 2014). The geospatial dataset contains hydrologic response units (HRU's) that define areas of similar physical features, such as slope or soils type, which influence hydrology; stream segments that route runoff through the stream network; and summary nodes or points of accumulation. In other words, the Portal has processed and automated the more manual approach of the Thornthwaite program.

For purpose of estimating physical availability for ephemeral drainages, the following procedures should be used when employing the Futures Portal:

1. Once the Plots button has been selected the dialog for the "Simulated historic conditions: mean monthly plots" will open as the default window.
2. From the dropdown options, the user will set the Spatial Summary Type to "Local (HRU)".
3. The user will then use the Location from Map option to identify and select the HRU which contains the ephemeral drainage in question.
4. The variable of interest is set to Runoff.
5. The Period of record is set to the entire period of climate record (1952 – 2005) available in the Portal.
6. Select the "GSD" run. The GSD (Gridded Station-based Datasets) run is derived from historical climate observations and is used to generate simulated estimates of the historical record only.
7. The Subset by KS test p-value is left as "No Subset"
8. Once these parameters have all been set the user can Click to Plot and then Click to Download the monthly estimates of runoff (reported in mm) for the chosen HRU.
9. Once downloaded to a spreadsheet, the user will average the monthly data for the entire climatic period and then sum the monthly runoff averages to estimate an annual runoff depth.
10. The annual runoff depth will then be converted into a volume based on the ephemeral drainage area.
11. If desired, the annual volume may then be redistributed into semi-annual periods (Jan-Jun, Jul-Dec) using the procedure described later in this document.

The Portal can provide runoff estimates for relatively small drainage areas, but again the estimates are based on limited streamflow data for eastern Montana, so there will be some associated error.

Thornthwaite Program

An earlier graphical user interface using the Monthly Water Balance Model was developed by the USGS in 2007 (McCabe and Markstrom). This program, referred to as the Thornthwaite Program, is sometimes being used by DNRC to estimate annual runoff from ephemeral drainages in Montana. This program may still be an option for our purposes but requires more preparation of climatic input files by the user, and selection of the correct model parameter coefficients.

In eastern Montana, part of the problem using Thornthwaite is how snowpack is treated in the model. In reality, snow water is stored above ground in the snowpack, but the model assumes that it is at least partly stored in the soil profile. In eastern Montana, the snowpack builds during frigid winter months (December through March) until a warm weather event melts it, producing runoff over frozen soil. Additionally, the initial soil moisture conditions in the model produce inaccurate estimates for the first year as the excess water initially assumed in storage is converted to runoff. Given this, a monthly timeseries of climate inputs should be used to generate estimates of runoff using the Thornthwaite program. The Water Management Bureau has found that using the longest available period of record for climate parameters, and discarding the first year of outputs, creates a much more realistic runoff scenario than has been previously output. These monthly estimates then can be averaged by month and summed to produce an annual runoff value, as one would do for aggregating Monthly Water Balance Model estimates generated from the Portal.

Estimated Runoff through Gage Evaluation

In the late 1980's, the NRCS used gage data to estimate runoff in Eastern Montana, resulting in a hand drawn contour map of average annual runoff (Correspondence from Joe Van Mullem to Sterling Sundheim, 1989). While no listing of gages used to create the contours was included, the map did include point values placed at the centroids of selected watersheds. From these points, it is clear that the gages used were not restricted to ephemeral drainages. Generally, the map shows annual runoff in central and eastern Montana to range between 0.14 and 0.40 inches – with the exception of the 0.5-inch isoline running through the center of the state resulting from the inclusion of Big Coulee and Sunday Creek in the sample. Other sites further east appear to be generated from relatively large watersheds that may better represent intermittent or perennial streams (similar to StreamStats) than runoff from small ephemeral watersheds.

While potentially problematic due to the limited data available at the time and inclusion of gages, the concept represents a reasonable approach. To this end, Water Management staff selected gages representing ephemeral drainages for four regions and estimated the average runoff in inches for each area (Table 1). These estimates use additional gage data and remove other gages from consideration (e.g. Big Coulee and Sunday Creek).

Table 1: Average Runoff by Geographic Area

Geographic Area	Average Runoff (in)
Missouri Basin north of the river	0.70
Missouri Basin south of the river	0.30
Yellowstone River Basin	0.10
Box Elder/Little Missouri River	1.00

As with the NRCS estimates, the updated estimates calculated by DNRC were generated from a limited number of gages and contain no concern for site specifics on a small scale; it's a very broad-brush approach.

Evaluation Period for Physical Availability

Runoff from ephemeral drainages is highly variable in magnitude and timing. Ephemeral drainages differ from intermittent and perennial sources in that outside of late-winter/early spring snowmelt, little or no additional runoff may occur for the remainder of the year. Any runoff that occurs will be driven by antecedent soil conditions and individual precipitation events, with no guarantee that a rain event actually translates into runoff. In addition, the distribution of runoff occurring during late-winter/early spring itself is variable between watersheds. In some cases, the peak may occur in March, in others June – although weather events could send water down the drainage as early as February and any months in between.

In addition, water rights on these systems are typically either water spreading systems or stock water reservoirs designed to take snowmelt driven runoff in February and March. Some reservoirs are designed to capture spring runoff for later use for irrigation, but their numbers pale in comparison to the other examples. Some drainages include direct flow stock rights, although the importance of such rights may be limited by the brief periods that water is available instream. There often aren't the types of water rights (e.g. instream or direct flow) that require a more detailed monthly evaluation as there are on perennial or intermittent streams. Under these conditions, with the only water rights on the system consisting of stock rights direct from stream, water spreaders, or reservoirs – then an evaluation of annual volumes will be sufficient. If there are, however, water rights with more detailed or shorter diversion periods, then the Department may consider shorter time-periods as necessary. To this end, the Water Management Bureau has developed a method to distribute volumes to semi-annual periods (Appendix A).

USGS Study Equations for Charles M Russell National Wildlife Refuge

The USGS Scientific Investigations Report 2009-5009, developed equations for estimating runoff for small drainages in the Charles M Russell National Wildlife Refuge (CMR). Use of these equations is a valid methodology within the CMR and the study area of the report (Figure 1, page 3). The equations were developed based on four years of gage data and site conditions for this area and they appear to become less reliable outside of the study area.

Other Approaches Considered, Investigated, and Eliminated

Curve Number

The NRCS Curve Number Method has a place in hydrology: to provide an estimate of the runoff response of a watershed given the physical characteristics of the watershed and a specific precipitation event, which must exceed infiltration capacity in order to generate runoff. Curve Numbers will not work to provide an annual or monthly runoff estimate by inputting annual precipitation and obtaining an annual runoff result.

Runoff as a Percentage of Annual Precipitation

The USGS published a graphic that broadly shows the average annual runoff throughout much of eastern Montana is between 0 and 1 inch. Moving westward, the runoff for central Montana ranges from 1 to 5 inches; a very small percentage of annual precipitation becomes surface flow. Also, there are only a few months during which surface flow is typically produced in ephemeral drainages.

Calculations based on stream gage data show that between five and ten percent of annual precipitation becomes runoff in very small drainages in eastern Montana. However, the monthly distribution of runoff does not correspond to the monthly distribution of precipitation. There is typically no runoff during December or January from ephemeral streams in the area. It is not unusual for snowmelt to occur in February during individual warming events, but it more commonly occurs in March, producing the most runoff of any month, and is followed by a smaller runoff rise in May and June from rainfall events.

Although it may be possible to pick a percentage of annual precipitation to run off, for example 7 or 8 percent, and then route the runoff through a hydrograph or average of hydrographs in an area, this would still be an arbitrary approach that doesn't consider local watershed features.

Climate Office P minus ET

The Montana Climate Office at the University of Montana has developed several useful products, one of which is a series of monthly maps depicting evapotranspiration (ET) across the state. Employing assumptions that restrict runoff to only eight months when water might actually be flowing, we may use Precipitation minus Evapotranspiration to estimate runoff for "average" or "normal" years. This approach was also abandoned due to the use of multiple assumptions and arbitrary conventions.

Various Rainfall-Runoff Models: PRMS, VIC, HEC, etc.

There are several precipitation-runoff models available: USGS Precipitation-Runoff Modeling System, University of Washington Variable Inflation Capacity model, US Army Corps of Engineers Hydrologic Engineering Center, and others. For our purposes, these models are overly complex and require highly detailed parameter inputs that likely do not improve the accuracy of the runoff estimate. These are valuable models, but this is not the right application of them.

Appendix A: Distribution of Annual Values to Semi-Annual Periods

Water Management Bureau has identified a sample of gaged ephemeral drainages in order to make some determination about the percentage of annual volume expected to be seen through June – for three geographic areas in Eastern Montana: Missouri Basin north of the river, Missouri Basin south of the river, and the Yellowstone Basin. These percentages, appearing below in Table 2, represent the median values from gages found in each region

Table 2: Percentage of Annual Runoff Occurring Jan-Jun and Jul-Dec

Geographic Area	Percentage Runoff Occurring Jan-Jun	Percentage Runoff Occurring Jul-Dec
Missouri Basin north of the river	74	26
Missouri Basin south of the river	87	13
Yellowstone River	98	2

Missouri Basin north of the river

Gage	Stream	% Occurring Jan-Jun	Drainage Area
06150500	E Fork Battle Cr nr Intl Boundary	95	84.8
06170080	Starbuck Coulee nr border	80	4.25
06154140	Fifteenmile Cr Trib nr Harlem	79	2.11
06115350	Rock Cr nr Landusky	75	74.5
06115300	Duvall Creek near Landusky	73	4.43
	South Creek Tributaries, near Opheim	67	1.33
06164623	Little Warm Cr Trib nr Lodge Pole	52	2.39
06154490	Willow Coulee nr Dodson	44	5.53
	Median %	74	

Missouri Basin south of the river

Gage	Stream	% Occurring Jan-Jun	Drainage Area
06131120	Timber Cr nr Van Norman	99	284
06177700	Cow Creek Tributary near Vida	96	1.45
06130700	Sand Cr nr Jordan	87	315
06131200	Nelson Creek nr Van Norman	79	110
06130650	Hell Cr nr Jordan	76	70.3
	Median %	87	

Yellowstone Basin

Gage	Stream	% Occurring Jan-Jun	Drainage Area
06328200	Lower Sevenmile Cr nr Bloomfield	100	25.2
06294600	East Cabin Cr Trib nr Hardin	100	8.01
06326952	Clear Cr nr Lindsay	99	101
06307560	E. Trail Cr near Otter	98	32.2
06336447	Duck Cr near Wibaux	97	43
06307525	Prairie Dog Creek near Birney	82	6.55
	Median %	98	

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Technical Memorandum: Net Surface Water Depletion from Ground Water Pumping

Date: July 6, 2018

To: Millie Heffner, Water Rights Bureau Chief

From: Russell Levens, Hydrologist, Water Management Bureau

The purpose of this technical memorandum is to describe the standard practices DNRC use to calculate net depletion to evaluate criteria under §85-2-311, MCA for ground water permits and §85-2-402, MCA for ground water changes. Net depletion calculations also are subject to provisions of §85-2-360, MCA for ground water permits in basins closed to new surface water appropriations.

Net depletion of surface water resulting from ground water pumping is the calculated volume, rate, timing, and location of reductions to surface water flow resulting from a ground water pumping. Net depletion is evaluated by:

1. developing a hydrogeologic conceptual model
2. identifying potentially affected surface waters,
3. calculating monthly consumption, and
4. calculating monthly net depletion.

The standard practices for evaluating net depletion are believed to be generally adequate to provide substantial credible evidence necessary to evaluate criteria under §85-2-311, MCA. DNRC may deviate from standard practices for evaluation of net depletion if an applicant provides credible information to support a different evaluation. Additional information provided by an applicant might refine the hydrogeologic conceptual model, support delineation of different potentially affected surface waters, justify different consumption calculations, and/or support more detailed modeling. DNRC will assess the value of additional information and justify whether or not to deviate from the standard practice.

Hydrogeologic Conceptual Model
A hydrogeologic conceptual model is a description of the physical characteristics of an aquifer that control the flow and storage of ground water including interactions with surface water. Hydrogeologic conceptual models developed in net depletion evaluations by DNRC rely on aquifer testing and information readily available in published reports, maps, and databases. Reports and maps published primarily by the U.S. Geological Survey (USGS) and the Montana Bureau of Mines and Geology (MBMG) provide fundamental information on geology, aquifer

boundaries, and aquifer properties. The Ground Water Information Center (GWIC) and Montana Board of Oil and Gas Online Oil and Gas Information System databases provide information pertaining to lithology and well construction reported on driller's logs as well as water level and water chemistry monitoring, and aquifer test data. Aquifer testing conducted by applicants provides site-specific information on aquifer properties and boundaries.

A hydrogeologic conceptual model in a net depletion evaluation incorporates information on the hydraulic connection and interactions between a source aquifer and surface water. Information incorporated in a conceptual model may include the depth a stream penetrates the saturated thickness of an aquifer, character of streambed sediments, and measured stream losses or gains.

Potentially Affected Surface Waters

Potentially affected surface waters in a net depletion evaluation are identified by their hydraulic connection to the source aquifer of a prospective ground water diversion based on the hydrogeologic conceptual model. Procedures for evaluating hydraulic connection and identifying one or more potentially affected surface water(s) depend on whether a proposed well is in an unconfined aquifer, in a confined aquifer in western Montana intermontane basins, or in eastern Montana regional bedrock aquifers. Aquifer type is determined from information obtained from geologic maps, lithology from well logs, or published reports by the USGS, MBMG, or other researchers, or hydrogeologic assessments conducted by consultants. Procedures in this document pertain to unconfined aquifers and confined aquifers in intermontane basins. Procedures for regional bedrock aquifers in eastern Montana are presented in a separate document.

Net depletion is apportioned between multiple potentially affected surface waters generally following procedures described in Section 3.2 of a guidance document developed by the Province of British Columbia (2016) for determining the effect of ground water diversion on specific streams. Depletions are apportioned through an iterative process based on inverse-distance squared stream weights. Once an initial set of streams has been identified, calculated stream weights are assigned. These weights represent the percent of depletions assigned to individual streams and sum to one. If any of the streams initially evaluated have scaled weights less than 0.1, representing less than 10% of total depletion attributed to that source, they are eliminated from consideration and the weights are recalculated for the remaining potentially affected sources, with the sum of all final weights equal to one.

Hydraulic Connection - Unconfined Aquifer

Hydraulic connection of surface water(s) to an unconfined source aquifer of a proposed well is based on an iterative consideration of proximity and comparison of ground water elevations relative to surface water bed elevations of potentially affected sources. For an initial screen, potentially affected surface waters are identified in the area surrounding a proposed ground water diversion that lies between the source aquifer boundary and the highest order stream transecting the source aquifer. Hydraulic connection of individual stream reaches to ground water is evaluated by comparing streambed elevations to static ground water elevations measured in wells less than 50 feet deep and within 1,000 feet of surface water or from published water table maps. Surface water within that area is considered hydraulically connected to the source aquifer if static ground water elevations are above or within 10 feet of the elevation of the stream bed.

Hydraulic Connection - Confined Basin-Fill Aquifers

Tertiary-age basin-fill sediments that underlay shallow alluvial aquifers in intermontane basins in western Montana can be 1,000s of feet thick and contain thick confining layers. Drawdown caused by pumping may spread over large distances, often extending to basin margins and ultimately depleting either the main outflow from the basin or surface waters at locations where confining layers are thinner, more permeable, or absent. Hydraulic connection of a confined aquifer to surface water depends on the continuity and properties of its confining layer as well as the hydraulic connection of the overlying unconfined aquifer to surface water.

The existence, continuity, and thickness of confining units are examined to determine whether depletions will occur at local or basin scales. Examinations of confining layers are based on the occurrence of fine-grained sediments in lithology descriptions from driller's logs obtained from GWIC, geologic cross sections constructed by DNRC or other sources, or published confining unit thickness maps by USGS or MBMG.

Hydraulic Connection- Fractured Bedrock Aquifers

Fractured bedrock aquifers in western Montana may be tapped for ground water beneath basin-fill sediments, but typically are important around basin margins or in valleys without significant basin fill sediments. Fractured bedrock aquifers may be unconfined at shallow depths or confined where fracturing does not extend to the water table.

Hydraulic connection of surface waters to fractured bedrock aquifers in intermontane basins is based on a geologic conceptual model describing the location and character of mapped geologic structures, outcrops or sub-crops, karstic conditions, and a confining unit. Generally, wells completed greater than 100 feet deeper than the bed of a potentially affected surface water are considered confined. Geologic maps are key evidence of the location and character of geologic structures that may connect a source aquifer in fractured bedrock to surface water or an overlying unconfined aquifer. Surface drainage patterns also often provide evidence of the presence of faults or fracture patterns that can reveal hydraulic connection between a bedrock aquifer and surface water. Distance measured to evaluate hydraulic connection and weight depletion among potentially affected surface waters is measured along the strike of any geologic structures believed to provide hydraulic connection.

Consumption

Consumption is evaluated according to the use of a proposed ground water appropriation following standard practices adopted by DNRC.

Ponds and Wetlands

Standard procedures for estimating evaporation from ponds and evapotranspiration (ET) from wetlands fed by ground water are described in the Technical Memorandum: Pond and Wetland Evaporation/Evapotranspiration dated March 14, 2018.

Crop Irrigation

Monthly consumption for crop irrigation is equal to the net irrigation requirement (NIR) calculated using the USDA Natural Resources Conservation Service (NRCS) Irrigation Water Requirements (IWR) program plus irrecoverable losses not associated to crop growth. The IWR Program computes total monthly crop ET, effective precipitation and NIR. The Blaney-Criddle

Method (TR21) used by DNRC, is described in detail in the National Engineering Handbook (1993). The following inputs to IWR for calculation of NIR are consistent with inputs used to develop the DNRC consumptive use rules in ARM 36.12.1902:

1. System and Local defaults in the Options Tab in IWR are unchanged.
2. The closest weather station is selected for climate data unless there is a more representative station based on elevation or another factor.
3. Site elevation and precipitation ratios are unchanged.
4. Start and end dates are calculated by IWR using default temperatures.
5. Net irrigation depth applied each irrigation is set to 1" for center pivot irrigation and 4" for other irrigation methods.
6. Carryover used at the beginning and at the end of each season is 25% of the net application depth.

Irrecoverable losses are equal to 5% for flood, wheel line, or hand line sprinkler, and 10% for center pivot irrigation sprinkler. Application rate is equal to NIR divided by an appropriate on-farm efficiency (Table 1). Values presented in Table 1 are similar to those percentages associated with the Irrigation Standards presently in rule for permit applications (ARM 36.12.115). An additional value for wild flood on-farm efficiency is presented as 25% (Neibling 1997, Utah State 2008).

Table 1: On-farm efficiency.

Irrigation Method	Efficiency
Sprinkler	0.70
Level Border	0.60
Graded Border *(Design Slope = .1-.4%)*	0.70
Graded Border *(Design Slope = .75-1.5%)*	0.65
Graded Border *(Design Slope = 3%)*	0.60
Furrow *(Design Slope = .1-.4%)*	0.70
Furrow *(Design Slope = .75-1.5%)*	0.65
Furrow *(Design Slope = 3%)*	0.60
Contour Ditch *(Design Slope = .75%)*	0.60
Contour Ditch *(Design Slope = 1.5-3%)*	0.55
Contour Ditch *(Design Slope = 6%)*	0.45
Wild Flood	0.25

Public Water Supplies and Other Multiple Use Appropriations

Consumption for public water supplies and combined appropriations results from evaporation during cooking, showering, and other indoor uses, evaporation during wastewater treatment and disposal, and NIR for lawn and garden irrigation. Withdrawals for specific uses can be obtained from DNRC or DEQ administrative rules or from values in publications such as the Manual of Small Water Supply Systems (EPA, 1991). Consumptive use coefficients listed in Table 2 are multiplied by withdrawal values to calculate consumption for evaluations of net depletion. These coefficients are based on the results of studies by Kimsey and Flood (1987), Vanslyke and Simpson (1974), and Paul, Poeter, and Laws (2007). Consumptive use coefficients for other purposes can be obtained from published reports such as Shaffer and Runkle (2007).

Table 2: Consumptive use coefficients for public water supply use with wastewater disposal and treatment.

Wastewater Treatment / Disposal	Consumed
Individual drainfields	10 %
Central treatment facility with minimal consumption	5 %
Evaporation basin or land application	100 %

Consumption for lawn and garden irrigation is based on the NIR for pasture grass calculated using IWR with inputs consistent with ARM 36.12.1902 and estimates of irrigated acreage provided by applicants.

Other Uses

Consumption for evaluating net depletion is assumed to be 100% for municipal, stock water, industrial, oil well flooding, water marketing for water depots, agriculture spraying, and some commercial uses. Open-loop geothermal systems where ground water is pumped and reinjected into the same source aquifer are considered non-consumptive if the pumping and injection rates are equal.

Rate and Timing of Net Depletion

Net depletion is the calculated difference between the amount of water depleted from a surface water source by pumping ground water and the amount of that water put to beneficial use but not consumed that accretes to surface water. Depletion results from propagation of drawdown from a pumped well to potentially affected surface waters. Drawdown can propagate in any direction independent of ground water flow rate or direction (Leake, 2011). Drawdown also can propagate through a confining layer to an overlying aquifer (Konikow and Neuzil, 2007) or to outcrops of a confined aquifer located miles away from a pumping well. Capture occurs as drawdown propagates through an aquifer to hydraulically connected surface waters and areas of phreatophyte vegetation that takes water directly from ground water. In the absence of credible evidence to the contrary, capture of ET by phreatophytes is neglected and net depletion is assumed to equal total capture. This assumption is made because published estimates for conditions common in Montana alluvial valleys indicate capture of ET generally is less than 10 percent of total capture (Xunhong, 2006). Return flows accrete to surface water in a process opposite of capture as mounding propagates to hydraulically connected surface waters and areas of phreatophyte vegetation. Similar to depletion, mounding propagates in all directions independent of ground water flow rate or direction and generally does not depend on surface topography.

Net depletion is calculated based on the fundamental concept that the amount of water withdrawn eventually is offset by an equivalent increase in ground water recharge or decrease in ground water discharge (Theis, 1940; Leake et al., 2008), a process defined as capture by Lohman (1972). The rate and timing of depletion to surface water source resulting from pumping from an unconfined aquifer typically is modeled by DNRC using analytical models including the Alluvial Water Accounting System (AWAS) and the Well Pumping Depletion Model (WPDM). A source aquifer is assumed to behave as an equivalent porous medium with constant aquifer properties and the model is run until equilibrium conditions are achieved.

Return flows also are modeled using AWAS and WPDM using recharge wells distributed across the place of use instead of pumping wells used in a depletion analysis. Return flows also may be calculated using the Glover parallel drain model implemented in a spreadsheet or the Stream Accretion Model (SAM). All analytical models used by DNRC have specific assumptions regarding the properties, geometry, and boundaries of an aquifer being modeled that need to match the conceptual model of a specific application. Complex numerical ground water flow models may be used to calculate net depletion if they are available from MBMG, the USGS, other researchers or consultants and appropriate for that purpose. However, appropriate numerical models generally are not available and the ground water models used most frequently by DNRC are analytical models that represent simple aquifer and stream geometries that are suitable where input data are limited.

Net depletion is evaluated by calculating depletion from ground water pumping and return flows of non-consumed water separately where return flows go to a different source or occur at a different location than ground water pumping. However, the timing of depletion from pumping ground water and timing of associated return flows are assumed to be the same under circumstances where a pumped well and the place of use where return flows occur are the same relative distance from a potentially affected surface water. Under those common circumstances, net depletion is modeled directly by setting the monthly pumping rate equal to the monthly consumption (e.g. from IWR). Net depletion equals consumption from a source on an annual basis whether pumping withdrawals and return flows are modeled in separate steps or whether the difference between withdrawals and return flows (i.e. consumption) is modeled in one step.

Standard inputs to models used to calculate net depletion are transmissivity, specific yield, distance to a surface water source, and distance to any no-flow boundaries that are modeled. Aquifer transmissivity is taken from the Department's Aquifer Test Report unless more representative values are available or where an aquifer test was not conducted under a variance. Transmissivity also may be calculated by multiplying tabulated values for hydraulic conductivity from published sources such as Bear (1972) by saturated aquifer thickness determined from representative driller's logs from GWIC. A specific yield of 0.1, based on Lohman (1972), is the default value for modeling net depletion. Distances to potentially affected surface waters and no-flow boundaries are representative values taken from mapped hydrography and/or geology.

The rate and timing of net depletion is assumed to be constant year-round where a proposed use from any aquifer type is constant year-round or where a well pumps from a confined basin-fill aquifer or from a depth greater than 100 feet in a fractured bedrock or a karstic limestone aquifer.

Return Flow Analysis

The following procedures are followed when net depletion is evaluated by modeling return flows depletion from ground water pumping separately. Monthly volumes of non-consumed water that returns to a source from a proposed new ground water use that are input to an appropriate model are calculated by dividing total consumption including irrecoverable losses by on-farm efficiency.

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Technical Memorandum: Numerical Groundwater Modeling Guidance

Date: October 7, 2019

To: Millie Heffner, Water Rights Bureau Chief

From: Melissa Schaar, Groundwater Hydrologist, Water Management Bureau

1. Introduction

The purpose of this memorandum is to describe standard practices that the Department or applicant follow when building a numerical groundwater model and the systematic review to ensure that modeling is conducted and documented appropriately. The Department and applicant may model a proposed groundwater use for the purpose of evaluating the criteria for a groundwater application for beneficial use or change in use. Groundwater models may also be used to support Stream Depletion Zone and Controlled Groundwater Area determinations. Because major decisions are frequently based on modeling results, it is essential that modeling be conducted in a manner that provides results that reasonably portray the physical system.

It is important to recognize that models are conceptual descriptions, or approximations, that describe physical systems through the use of mathematical equations – they are not exact descriptions of physical systems or processes (Anderson et al., 2015). Groundwater models are not a substitute for field investigations but should be used as supplementary tools. The applicability, or usefulness, of a model depends on how closely the mathematical equations approximate the physical system being modeled. For this reason, models that are based on a thorough understanding of the physical system and the assumptions of the mathematical equations produce better predictions. They produce estimates, not absolute answers. Results depend on the quality and quantity of the data available to define input parameters and boundary conditions (Anderson et al., 2015).

Numerical models (e.g., finite difference or finite element) solve the partial differential flow equations through numerical approximations using matrix algebra and discretization of the modeled domain (Anderson et al., 2015). In discretization, the model domain is represented by a network of grid cells or elements and the time of the simulation is presented by time steps. The accuracy of numerical models depends on the model input data, the time periods, and the numerical method used to solve the model equations. Numerical models may be of limited value when there are limited data and in simple hydrogeologic settings where the cost of creating such a model outweighs the information they provide. For example, the Department uses transient superposition numerical models in MODFLOW following the general approach described in the **Appendices**.

This guidance outlines the general groundwater modeling protocol used by the Department and ensures that numerical groundwater modeling is conducted and documented appropriately. The modeling process is shown in **Figure 1**. For more complex modeling projects, the Department recommends meeting with staff hydrogeologists to discuss distinctions of the specific modeling process.

This guidance is not intended as a standalone step-by-step manual for groundwater modeling. It is not the intent of this document to provide a detailed discussion of all groundwater modeling concepts or procedures. This guidance has resulted from a thorough review of available groundwater modeling documentation and a review of current Department modeling procedures. Throughout this document references are cited that provide a more thorough discussion of the concepts presented and additional references that provide examples, standards, and guidance are located in **Section 11**.

This modeling guidance is divided into the following sections:

- Objectives
- Data
- Conceptual Model
- Model Development
- Calibration
- Uncertainty
- Predictions
- Documentation
- Model Review
- References
- Appendices

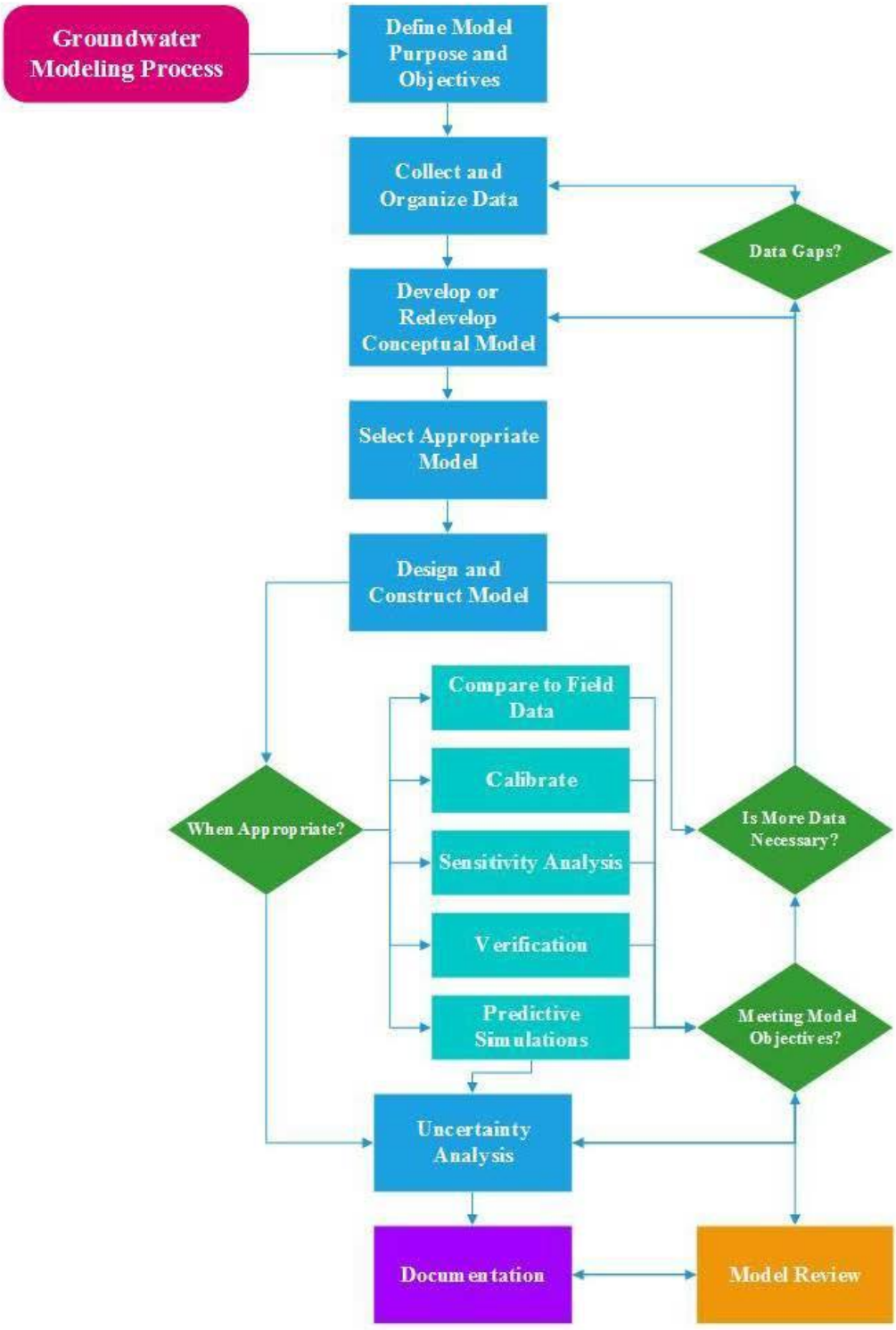

Figure 1. Groundwater Modeling Process.

2. Objectives

The purpose/objectives of modeling should be clearly defined and understood because it dictates the selection and development of the model. These objectives will dictate the level of detail and accuracy required in model simulation. The objectives will be used during the review process as criteria to judge whether the model is fit for the purpose and is able to answer the questions posed.

3. Data

The availability of data may influence model selection and construction. Basins with a large amount of data may support a more complex modeling effort than a basin with limited data. The data will be used not only during the conceptual model, but also during the design and calibration of the model. Information gathered includes data about the model layers and hydraulic parameters as well as observations of hydraulic head, water table elevation, and fluxes.

The data collection process involves:

- Confirming the location and availability of data
- Assessing the geospatial distribution, richness, and validity of data
- Developing a database which includes data source organized and available upon request after model submittal.

Often, the complexity of the model chosen is dictated by the amount and credibility of data. As shown in **Figure 1**, additional data gathering efforts may be required to meet the modeling objectives.

4. Conceptual Model

A conceptual model is a simplified description and schematic that outlines the components of the system to be modeled. Conceptual models are one of the most important parts of the groundwater model and should adhere to the principle of parsimony; that is the conceptual model should be the simplest possible description of the system while including all relevant processes and containing enough complexity to represent important system behavior (Wels et al., 2012; Anderson et al., 2015). The model must be based on a thorough understanding of site hydrogeologic conditions derived from field investigations or data obtained from credible studies. At a minimum, the conceptual model should include the geologic (eg., lithology and geologic structure) and hydrologic framework, hydraulic properties, areas of recharge and discharge (sources and sinks), groundwater flow directions, hydrogeologic discontinuities boundary, groundwater budget components, and spatial and temporal dimensionality. An in-depth discussion of the aspects and importance of conceptual model development is provided in ASTM D5979-96, Bredehoeft (2003; 2005), and Anderson et al. (2015).

5. Model Development

5.1 Model Selection

A model should be chosen based on its applicability to the conceptual model, availability of the required input data, and the defined purpose/objective of the modeling effort. It is important to choose a model that simulates the natural system as accurately as possible. Likely, the amount of

data will determine the complexity of the model selected. For instance, limited available data may necessitate the use of an analytical model or superposition numerical model versus a more data intensive numerical model. In addition, it is important that any model selected be code-verified, peer-reviewed, and well documented. For example, the USGS MODFLOW finite difference groundwater model and the various iterations have been code-verified, extensively peer-reviewed, and well documented (Harbaugh, 2005).

5.2 Parameters

Of the quantities assigned to the hydrogeologic units during model creation, the hydraulic properties are some of the most uncertain and most important in governing final predictions (Anderson et al., 2015). Hydraulic properties assigned to hydrogeologic units include hydraulic conductivity (K), transmissivity (T), specific yield (Sy), specific storage (Ss), and porosity. Inputs should be based on field data and, in some cases, literature values. These hydraulic parameters may be determined by a number of methods including aquifer tests and borehole geophysical methods (Freeze and Cherry, 1979; Keys, 1990; ASTM 5979-96; Fetter, 2001). The use of literature values may depend on how sensitive the model is to the particular parameter whether the approach is conservative, and in some cases, whether there is data available. The Department requires that groundwater models be built with realistic aquifer parameters and that modelers don't force calibration with aquifer properties that aren't realistic.

5.3 Boundary Conditions

There are generally three mathematical classes of boundary conditions: specified head boundaries, specified flow boundaries, and head-dependent. Examples of boundaries are hydraulically connected surface water bodies, and in some cases, bedrock and geologic structures. The implementation of these different boundaries in numerical models is beyond the scope of this document, but modelers are strongly encouraged to consult ASTM D5447-04, and Reilly and Harbaugh (2004), Anderson et al. (2015), during the assignment of boundary conditions. Care should be taken when selecting the type of flow or head boundary, with the modeling objectives carefully considered. For example, the use of specific head boundaries to represent recharge may yield invalid results from modeling depletion to streams by allowing recharge to increase unrealistically to offset pumping effects. The Department requires that the model accurately represent perennial surface waters of interest within the model domain. It is desirable to represent only existing natural hydrogeologic boundaries in a model; however, in some cases a nested or sub-model may be constructed within a larger domain. In these instances, the grid boundaries should be sufficiently remote from the area of interest so that the artificial boundary does not significantly impact the predictive capabilities of the model (Anderson et al., 2015).

The influence of climate (precipitation, evaporation, etc.) over the surface of the model domain constitutes another important boundary condition depending on the modeling objectives. For example, change in climate would not be a consideration for simple superposition modeling with the objective of assessing stream depletion. However, climate should be considered for larger scale models such as ones for controlled groundwater areas. There are a variety of methods for the implementation of recharge boundaries and are discussed in detail in Healy (2010) and Anderson et al. (2015).

5.4 Grid Design

Most numerical methods require the development of a grid overlay. The formation and input of this database is specific to the computer code chosen. Grid spacing should be an appropriate scale for the problem. Grid spacing should be closer together in areas where there are large spatial changes in transmissivity or hydraulic head. Large changes in hydraulic head typically occur in recharge and discharge areas and may be especially significant near pumping wells. In the case of modeling Stream Depletion Zones, the Department requires grid spacing to be between 50 and 100 feet near river and stream cells. Outside of these areas requiring finer grid detail, a coarser grid may be utilized for computational efficiency. However, as a general rule, grid spacing should not be more than 1.5 times the previous spacing (Anderson et al., 2015). For more discussion on grid development and proper grid spacing, see Anderson et al. (2015).

6. Calibration

Calibration consists of changing values of input parameters in an attempt to match field conditions within acceptable criteria. Calibration requires that field conditions be properly characterized. Lack of proper characterization may result in a calibration to a set of conditions that do not represent actual field conditions. There are a variety of methods that may be used to calibrate groundwater flow models, including both manual methods (e.g., trial-and-error) and automatic methods (e.g., PEST; Doherty and Hunt, 2010, and UCODE; Poeter et al., 2014). Calibration targets (the points in the model domain assessed for agreement) may include: hydraulic heads, hydraulic fluxes, or water mass balance (Wels et al., 2012; Anderson et al., 2015).

When the best calibrated match is achieved, a final input data set should be established and demonstrated to be reasonable and realistic. There are no universally accepted "goodness-of-fit" criteria that apply in all cases and professional judgment is needed in evaluating calibration results. In some circumstances, groundwater models are needed to predict behavior in regions where there is limited data. Without data, it is impossible to calibrate a model. This does not mean that modelling is not worthwhile. It simply means that there is a lower degree of confidence in models that are not calibrated. Whether or not a model is calibrated is dictated by the original modeling objectives. For example, the Department uses uncalibrated models for evaluating stream depletion by modeling pumping effects directly, using the principle of superposition (see **Appendices**). In the case of an investigation for a proposed controlled groundwater area or stream depletion zone, a calibrated model may be necessary.

For additional information on model calibration see ASTM D5490-93, ASTM D5981-96, Reilly and Harbaugh (2004), and Anderson et al. (2015).

Whether or not a sensitivity analysis, field verification, and/or post-audit is performed is dictated by the modeling objectives. For additional information, see ASTM D5611-94 (2002) and Anderson et al. (2015).

7. Uncertainty

Groundwater models intrinsically contain uncertainty because they are built on a simplified conceptual model of the actual system and the history of observations is nearly always less than the period of the prediction (Bredehoeft, 2003; 2005). It is important for the model report to

address this uncertainty. The performance of a formal uncertainty analysis is not always necessary; however, at a minimum, a qualitative description of the modeling uncertainties should be reported. The degree of acceptable model uncertainty is dictated by the modeling objectives.

8. Predictions

In the majority of cases, a groundwater model submitted to the Department is used for predicting the future hydraulic conditions (e.g., hydraulic heads, groundwater fluxes, etc.) in an area of interest. Upon model completion (after completion of calibration, sensitivity analysis, and field verification if performed), the model can be used to predict future scenarios. Predictive simulations can also be used to predict responses to the system as natural- or man-induced stresses are applied. The predictive simulations should be viewed as estimates and not as certain. There is always some uncertainty in predictive models. Predictive simulations should be conservative. That is, given the uncertainty in model input parameters and the corresponding uncertainty, model input values are selected that result in a "worst-case" simulation (Barnett et al., 2012; Wels et al., 2012).

The length of time that a transient predictive scenario is run compared to the length of time over which the model has been calibrated can influence the confidence-level classification of the prediction (Barnett et al., 2012). When the predictive model duration substantially exceeds the period of transient calibration the uncertainty associated with the prediction increases. This guidance recommends limiting the duration of predictive model runs to less than five times the duration of the calibration whenever possible. However, exceedance of this timeframe may occur and depends on the initial modeling objectives and acceptable level of uncertainty. The time interval of predictions varies on a project-by-project basis, and as such, the Department makes no strict rules for this aspect of groundwater modeling. The rationale for the period of predictions, however, should be logically determined and described in the model report.

9. Documentation

Documentation of a model is important to show that the interpretations represent site conditions. This will facilitate peer review and also enable further verification by allowing the model to be reproduced by future modelers. Results should be presented clearly, concisely and include appropriate documentation. Model documentation includes written and graphical presentation of the assumptions and objectives, the conceptual model, code description, model construction, calibration, predictive simulations, and conclusions. **Table 1** provides an outline of suggested components incorporated into a groundwater modeling report. Depending on the modeling objectives, complexity, and modeling code chosen will determine the necessary components of documentation. Additionally, some reports may include sections not listed in **Table 1**. Numerous details and considerations with respect to model reporting are outlined in ASTM D5718-95, Reilly and Harbaugh (2004), Barnett et al. (2012), and Anderson et al. (2015).

Table 1. Suggested Components of a Groundwater Modeling Report.

Objectives	Specific and clearly stated.
Data Needs	Methods and techniques for collecting, analyzing and interpreting data explained with levels of confidence. Identification of data gaps or strengths. Location of where data can be obtained.
Conceptual Model	Detailed narrative, maps, and figures of geologic and hydrologic framework, hydraulic properties, areas of recharge and discharge, groundwater flow directions, boundaries, groundwater budget components, and spatial and temporal dimensionality. All sources of data used.
Model Description	Rationale for choice of model. Simplifying assumptions and limitations of model and impact on results.
Model Construction	All input data, including initial conditions, boundary conditions, and hydraulic parameters defined. All sources of data used, whether derived from published sources, measured, or calculated from field data or laboratory testing documented.
Model Calibration	Specific goals and procedures of calibration, results of the final calibrated model, departure from the calibration targets, the effects of the departure on the model results, and the overall water balance.
Sensitivity Analysis, Verification	Describe goals, procedures, inputs, and results.
Uncertainty	Description of modeling uncertainty and how they relate to the modeling objectives.
Prediction	Output from predictive simulations presented and interpreted in detail. Limitations of and confidence in predictions stated.
Summary and Conclusion	Summarize the modeling effort and draw conclusions related to the study objectives. The limitations of the modeling and all assumptions discussed. Also, discuss uncertainties inherent to the model and their effects on conclusions.
Model Records	Provide upon request, input and output data sets for model runs (in digital form), including final calibration, and all predictions.
Modeling Team and Reviewers	Documentation and credentials of the modeling team and peer reviewers.

10. Model Review

The aim of the review process is to provide an objective assessment of whether the model has been developed and used in a manner that is appropriate for the stated modelling objectives and the target model confidence level classification. There are two types of reviews that will be covered in this section; peer review and Department review.

The peer review will take place before the model is submitted to the Department. The peer review is a thorough in-depth review of all stages of the groundwater model by an experienced hydrogeologist or preferably groundwater modeler whose involvement has been less than 20 percent of the total project. The reviewer does not have to be external and can be an experienced professional within the same company. A Department hydrologist with complementary skills and experience in groundwater modeling will perform an agency review of the submitted model. The reviewer may request all data and model files. **Table 2** is a compliance checklist that will be used by the Department reviewer of the submitted groundwater model.

For models produced by the Department, a Department hydrologist who did not develop the model will act as an internal peer reviewer.

Table 2. Department Review Compliance Table.

Questions

Does the modeling report contain enough information to complete a Department review?
Are the model objectives clearly stated?
Are the model objectives satisfied?
Is the conceptual model consistent with objectives?
Is the conceptual model based on all available data and presented clearly?
Does the conceptual model represent a reasonable representation of actual field conditions?
Is there sufficient data to develop the model? Are there any significant data gaps?
Is the model code chosen appropriate and conforms to best practice?
Is the model design appropriate and conforms to best practice?
If performed, is the calibration, sensitivity analysis, and verification satisfactory?
Are the model predications appropriate and conforms to best practice?
Are the modeling parameters and modeling results (fluxes, water balance, etc.) plausible?
Does the model submission apply sound and accepted modeling practices consistent with this guidance?
Are model limitations and model uncertainties adequately addressed?

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Appendix A – DNRC Standards for Numerical Superposition Modeling

This appendix describes the process of numerical superposition modeling performed by the Department for purposes of calculating net depletion or return flow analysis to surface water bodies as a result of groundwater withdrawal. A specific example of this type of modeling is provided in **Appendix B**.

Assumptions

Numerical superposition modeling is consistent with the Department's effort to avoid representing more detail than could be supported by existing data. Therefore, the Department has developed simplified assumptions for the numerical models used to investigate the impacts of groundwater pumping on stream flows.

Evaluations of the net depletions are based on the basic concept that groundwater pumping eventually is offset by an equivalent increase in recharge or decrease in discharge (Theis, 1940; Leake et al, 2008), a process defined as capture by Lohman (1972). Capture occurs as drawdown propagates to surface water and areas of phreatophyte vegetation that takes water directly from groundwater. In the absence of credible evidence to the contrary, capture of ET by phreatophytes is neglected and net depletion is assumed to equal total capture. This assumption is justified because published estimates for conditions common in Montana alluvial valleys indicate capture of ET generally is less than 10 percent of total capture (Xunhong, 2006). Capture of ET in ephemeral drainages may be significant and will be evaluated on an application by application basis.

Aquifer Parameters

The aquifer properties are estimated from site specific aquifer test results required as part of the groundwater permitting process (ARM 36.12.121). The aquifer test drawdown results are analyzed using AQTESOLV® (HydroSOLVE, Inc., 2007) by a Department hydrologist to obtain estimates of aquifer properties. AQTESOLV® is an analytical modeling software that uses image well theory and the principle of superposition to simulate aquifer stress tests.

When site specific aquifer test data is not available, results of aquifer tests conducted for other groundwater investigations in the area may be available from the Montana Bureau of Mines and Geology Groundwater Information Center (GWIC) or published values are generally suitable. For example, aquifer transmissivity can be calculated from an estimate of hydraulic conductivity from **Table 1** adapted from Bear (1972) and an estimated saturated thickness from well logs. The specific yield (Sy) of 0.1 for an unconfined aquifer (Lohman, 1972) is recommended when site specific aquifer test results are not available.

Table 1: Hydraulic conductivity values (from Bear, 1972).

Unconsolidated Sediment	Hydraulic Conductivity (ft/day)
Well Sorted Sand or Sand and Gravel	10 – 1,000
Very Fine Sand, Silt, Loess, Loam	0.001 - 1
Unweathered Clay	0.0000001 – 0.0001

Net Depletion

Net depletion is used in evaluations of legal availability and adverse effects to surface water required under §85-2-311, MCA. Net depletion is the calculated volume, rate, timing, and location of reductions to surface water flow resulting from a groundwater appropriation. Net depletion is evaluated in three steps: identification of potentially affected surface waters, calculation of consumption (DNRC, 2010), and calculation of the rate and timing of depletions to the identified affected surface waters following the procedures described in DNRC's Memo: Net Surface Water Depletion from Groundwater Pumping (DNRC, 2018).

Return Flows

Return flows are evaluated by identifying the likely receiving stream(s), determining monthly volumes of water that infiltrate past the root zone (non-consumed), and modeling the monthly timing of return flows. The receiving stream is determined by proximity and evidence of hydraulic connection to groundwater and generally does not depend on groundwater flow direction or land slope (Theis, 1938; Leake, 2011). The assumption is made that water applied for irrigation that is not consumed by a crop infiltrates to groundwater becoming return flow and does not run off. The amount of water not consumed is the difference between the amount of water consumed and the amount of water applied to a field. The amount of water consumed is equal to crop consumption from ARM 36.12.1902 and Irrigation Water Requirement (IWR) software (NRCS, 2003) plus irrecoverable losses calculated as a percent of applied amounts. The amount of water applied to a field is determined from estimates of application efficiency and crop consumption. This type of analysis is consistent with DNRC's Memo: Calculating Return Flows (DNRC, 2019).

Numerical Superposition Modeling

Monthly depletions and return flows can be modeled using an uncalibrated transient superposition model in MODFLOW 2000 following the general approach described by Hubbel et al. (1997), Johnson and Cosgrove (1999), and Leake et al. (2008) with potentially affected streams represented by drains as described by Johnson and Cosgrove (1999). Additional modeling procedures including parameters, boundaries, and grid development are consistent with those described in **Section 6** of this document.

The modeled pumping rates are based on a monthly consumptive volume calculated from the acreage and used as described in the previous section. Modification of the models for return flow analysis includes adding injection wells. The volume of return flow is evenly distributed on a monthly basis to the injection wells needed to cover the areal extent of the irrigated acreage.

The model is run until equilibrium or approximately one hundred years with each stress period representing one year with twelve time steps (months). The water balance for the twelve time steps of the 100^{th} year of of the model for each of the potentially affected streams (drain cells) are exported. The net depletion or return flow results are usually less than the total consumed and non-consumed volume, respectively, and are scaled up to match the total volume input into the model. The result is a model predicted timing of monthly net depletion or accretions to the potentially affected surface water bodies.

The modeling is completed by a Department hydrologist and the results are internally reviewed by a Department hydrologist.

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Appendix B – Transient Numerical Superposition Depletion Analysis

Example: Lower Yellowstone Buried Channel Aquifer (LYBCA)

The Department has performed stream depletion analysis for proposed wells located in the Lower Yellowstone Buried Channel Aquifer (LYBCA) using a superposition numerical model. The LYBCA is incised into the Fort Union Formation, and the Fort Union Formation acts as lateral boundaries and the base of the aquifer (Reiten, 2008; Reiten and Chandler, 2019). This example is a proposed production well (GWIC #300586), 142 feet deep and completed in sand and gravel of the LYBCA that has a width that varies between 0.6 miles and 2 miles. The proposed well is located 5.2 miles and 4.1 miles from Burns Creek and Yellowstone River, respectively (**Figure 1**). Depletion to surface water for the example is evaluated for Burns Creek and Yellowstone River. The annual consumption for the 134 irrigated acres of alfalfa at Savage, Montana is estimated to be 297.0 AF based on a net irrigation requirement of 26.6 inches (2.22 feet) obtained from Irrigation Water Requirement (IWR).

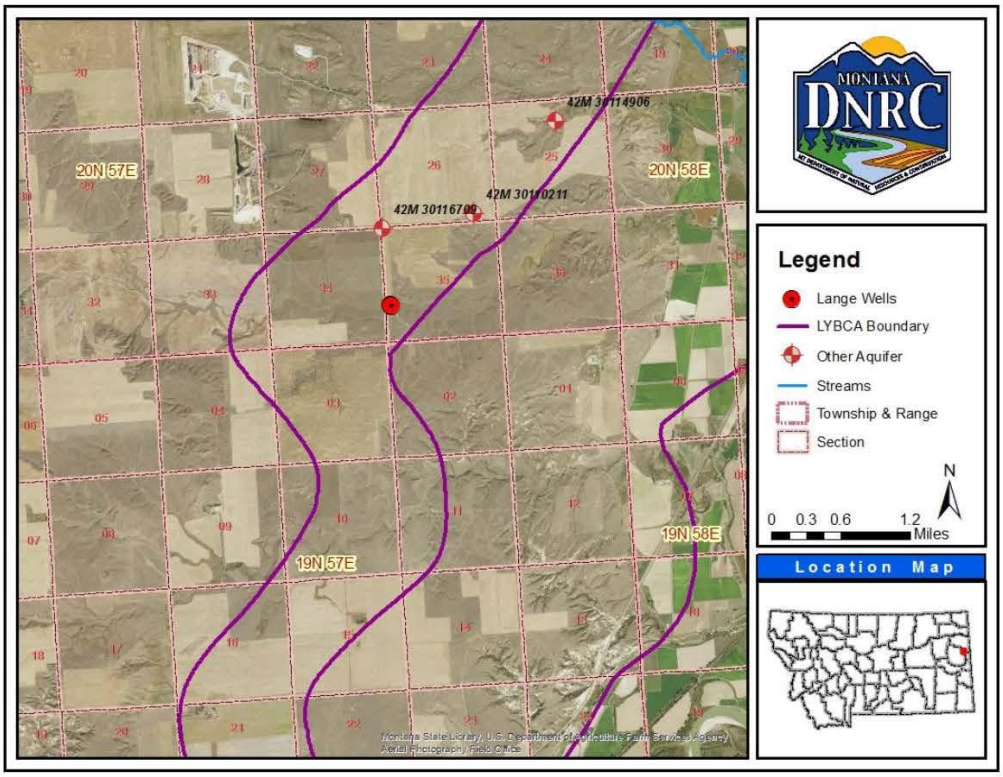

Figure 1: Map of the Lange Test Location (LYBCA Boundary from Reiten and Chandler, 2019).

Monthly depletions in **Table 1** are modeled using a transient superposition model in MODFLOW 2000 following the general approach described in **Appendix A** with Burns Creek and the Yellowstone River represented by drains. The model is run using a transmissivity of 29,970 ft^2/day and specific yield of 0.01 for the LYBCA generated from an aquifer test. The aquifer material surrounding the LYBCA is less transmissive and is run using 75 ft^2/day and specific yield of 0.02 from well log data and published values of similar aquifer material.

Calculated monthly consumption (Column 1, **Table 1**) is distributed based on IWR (Column 2, **Table 1)** and is modeled for 100 years. At the 100th year, the water balance output for the drain cells is scaled up to match the total consumed input into the model. Ultimately, total net depletions accumulate in the Yellowstone River downstream of Burns Creek and are reported as depletions in **Table 1**.

Table 1: Example of consumption, modeled pumping rates, modeled output for drain cells, and net depletion to Yellowstone River below confluence of Burns Creek.

Month	Crop Consumption (AF)	Modeled Pumping Rate (gpm)	Modeled Drain Output (Burns Creek) (gpm)	Modeled Drain Output (Yellowstone River) (gpm)	Modeled Total Drain Output After Confluence (gpm)	Modeled Net Depletion (AF)
January	0.0	0.0	102.8	42.4	145.2	19.5
February	0.0	0.0	142.3	52.7	195.0	26.2
March	0.0	0.0	141.1	51.9	193.0	26.0
April	2.3	17.69	139.1	50.8	190.0	25.6
May	44.0	321.13	136.7	49.5	186.2	25.1
June	64.0	482.60	134.2	48.4	182.6	24.6
July	82.0	598.25	132.5	47.8	180.3	24.3
August	72.8	531.42	132.3	47.9	180.3	24.3
September	31.9	240.88	133.7	48.9	182.7	24.6
October	0.0	0.0	136.3	50.4	186.7	25.1
November	0.0	0.0	139.2	51.8	191.0	25.7
December	0.0	0.0	141.4	52.7	194.1	26.1
	297.0					297.0

*gpm = gallons per minute

References

Reiten, J.C., 2008, Irrigation potential of groundwater underlying the lower Yellowstone Valley in Richland County, Final report to DNRC, RRG-0601280.

Reiten, J.C., Chandler, K., 2019, In preparation, Hydrogeologic Investigation of the Lower Yellowstone Buried Channel Aquifer, Richland County, Montana, Montana Bureau of Mines and Geology.

Technical Memorandum: Physical Availability of Surface Water With Gage Data

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Technical Memorandum: Physical Availability of Surface Water with Gage Data

Date: November 1, 2019

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James Heffner, Hydrologist, Water Management Bureau
Melissa Brickl, Hydrologist, Kalispell Water Resource Office

The purpose of this technical memorandum is to describe the standard practices DNRC uses to calculate physical availability of surface water as required in §85-2-311, MCA (1)(a)(i) and ARM 36.12.1702 for streams where gage data are available on the source of supply. Separate documents detail standard practices DNRC uses to calculate physical availability of surface water for sources with no gage data, for ponds, and for ephemeral streams.

Background

Stream gage station data, when available, is the best information to use for evaluating physical water availability for a new permit. This is recognized in the permit application criteria for physical surface water availability which state that "If actual stream gaging records are available, or the source has been otherwise measured and quantified by a public entity, the records shall be used to estimate the median of the mean monthly flow rates and volumes for the stream gaging station period of record during the proposed months of diversion at the source of supply in the amount the applicant seeks to appropriate" (ARM 36.12.1702(2)). The difficulty is that a proposed point of diversion (POD) is seldom in the immediate vicinity of the stream gaging station. Unless the POD is at or very close to the gage, the amount of water physically available at the POD will be different from the gage readings and adjustments should be made.

Current Practice

Where the POD is located above the gage, water rights between the POD and the gage will be added to the monthly median of the mean gage values to provide an estimate of physical availability at the POD. This allows for continuity and consistent representation of water legally

available downstream at the gage site. However, this can result in unrealistic estimates of physical availability at the POD. This typically occurs in the eastern part of the state, where the only gaging station on a stream is located at the mouth and the proposed POD is several miles upstream. In this scenario it is not uncommon for this to result in estimates of physical availability that exceed the amount of water physically generated above the POD or even by the entire watershed.

When the POD is located below the gage, water rights between the gage and the POD will be subtracted from the monthly median of the mean gage values to provide an estimate of physical availability at the POD. Depending on the type and magnitude of water rights, as well the length of the reach, the end result may show that there is no water physically available at the POD – which may or may not be a reasonable representation of stream conditions. If there is evidence or documentation that is contradictory to the physical available estimate generated from the calculations above, then an additional physical availability analysis should be undertaken for the local reach. This additional analysis may include the drainage area ratio method discussed below and/or may require discharge measurements.

Drainage Area Ratio Method

If additional analysis is required, the Department may use the Drainage Area Ratio Method detailed in USGS (2015) StreamStats, Chapter G, p. 13. Under this method, streamflow characteristics and contributing drainage area at a gage site and the drainage area of an ungaged site can be used in the following equation to estimate streamflow characteristics at an ungaged site:

$$Q_u = Q_g \left(\frac{A_u}{A_g}\right)^{exp_{Q,R}}$$

where Q is the streamflow characteristic, A is the contributing drainage area, and subscripts u and g refer to the ungaged site (POD) and the gage, respectively.

Apply a drainage area ratio adjustment with an exponent (ranging from 0.687 to 1.037, based on regression equations). The exponent varies for different streamflow characteristics (Q) and regions (R). Table 1-3 from StreamStats Chapter G lists the exponents (Appendix A).

The process is as follows:

1. Assess whether the streamflow characteristics are similar between the gage and the POD, in consultation with the Water Management Bureau.
2. Determine the median of the mean monthly flow at the gage.
3. Determine the drainage area at the gage and at the POD.

4. Apply the equation above for each month using the appropriate exponent for the month and the region. For example, the $Q_{MAY0.5}$ (50% exceedance or median) exponent for the West hydrologic region is 0.828.

In hydrologic regions 3, 4, 5 and 6 (northern and eastern Montana), the USGS did not create regression equations largely because of the high occurrence of zero flows. In those regions the exponent would be taken as 1.0 for all streamflow characteristics and all months.

The Drainage Area Ratio Method has two conditions specifically mentioned in the USGS publication. First, the streamflow characteristics must be similar between the gage and the POD. This condition refers to the general hydrologic characteristics of the stream, including but not limited to density of diversions, slope and source, geography and geomorphology. For example, streamflow characteristics at an upstream, undepleted flow site are not similar to a downstream, depleted location; nor are they similar for a snow-dominant flow regime versus a gage on the prairie. Likewise using a gage upstream of a dam to estimate flows downstream of the structure is not appropriate as streamflow characteristics are not the same. Streamflow characteristics for a site above a major diversion (relative to the flows in the stream) are not similar to those below a major diversion. These situations are not exhaustive but meant to provide examples of when it may not be appropriate to use the drainage ratio methodology. The judgement of similar streamflow characteristics would be made by the regional office in consultation with the Water Management Bureau.

Second, the method is limited to sites that are within a range of 0.5 to 1.5 times the drainage area at the gage. According to the USGS, for sites outside of this range the standard regression equations may give more reliable estimates than the Drainage Area Ratio Method.

Note that in northern and eastern Montana (hydrologic regions 3, 4, 5 and 6) there are no regression equations. Because the Department shall use the gage data and must determine the flow and volume physically available at a proposed POD, the method would not be strictly constrained by the range of drainage areas cited by the USGS. If the drainage area of the POD is outside the range proposed by the USGS, the regional office would evaluate results of the method for adequacy. The regional office will do one of the following:

1. Request or obtain measurements at the POD. If the measurements agree with estimates from the method, the method can be considered adequate.

2. Compare Drainage Area Ratio Method results to USGS regression equations (where they are available) or to other accepted estimation techniques. If the Drainage Area Ratio Method results are within the error for the estimation technique, the method can be considered adequate.

3. Draw on regional knowledge of source conditions and miscellaneous monthly measurements by public entities such as the USGS and DNRC. If regional knowledge with support from miscellaneous monthly measurements by public entities such as the USGS and DNRC verify the method, it can be considered adequate.

If, in the opinion of the Department, the current practice provides unrealistic results and the Drainage Area Ratio Method is either not appropriate or not verified by the analysis above, the source at the POD may be considered an ungaged source for the purposes of ARM 36.12.1702. If the source is considered ungaged, the source would then be subject to accepted estimation techniques in conjunction with measurements.

Between Gages: Interpolation

Where there is both an upstream and a downstream gaging station relative to the POD on the same source, the equation (equation 11) from StreamStats, Chapter G, p. 13 would be used to make a logarithmic linear interpolation between the two gages:

$$logQ_u = logQ_{g1} + \left(\frac{logQ_{g2} - logQ_{g1}}{logA_{g2} - logA_{g1}}\right) - \left(logA_u - logA_{g1}\right)$$

where Q_u is the streamflow characteristic, A is the drainage area, and subscripts u, $g1$ and $g2$ refer to the ungaged site (POD) and gaged sites 1 and 2, respectively.

The conditions are similar as for the Drainage Area Ratio Method. If the contributing drainage area of the ungaged site is outside of the range of 0.5 A_g to 1.5 A_g of either gaging station, the equation might provide unreliable estimates. If the streamflow conditions are similar for the source at both gages, and the periods of record for the gages are similar, the method can be considered adequate. The judgement of similar streamflow characteristics and the decision to accept the method outside of the range of 0.5 A_g to 1.5 A_g of either gaging station would be made by the regional office in consultation with the Water Management Bureau.

References

USGS 2015. Montana StreamStats. Scientific Investigations Report 2015-5019.

USGS 2015. Methods for estimating streamflow characteristics at ungaged sites in western Montana based on data through water year 2009: Chapter G in Montana StreamStats.

Appendix A

Exponents for Q50 by month for four hydrologic regions				
	WEST	NORTHWEST	UPPER YELLOWSTONE	SOUTHWEST
Q50 Jan	0.849	0.853	0.879	1.007
Q50 Feb	0.873	0.867	0.899	1.034
Q50 Mar	0.900	0.910	0.959	1.032
Q50 Apr	0.904	0.971	0.899	0.971
Q50 May	0.828	0.931	0.937	0.705
Q50 Jun	0.766	0.912	1.009	0.697
Q50 Jul	0.705	0.875	0.898	0.687
Q50 Aug	0.718	0.863	0.838	0.767
Q50 Sep	0.779	0.873	0.795	0.797
Q50 Oct	0.790	0.814	0.852	0.884
Q50 Nov	0.810	0.771	0.879	1.037
Q50 Dec	0.810	0.802	0.917	1.016

From Table 1-3, USGS Scientific Investigations Report 2015-5019-G

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Technical Memorandum: Physical Availability of Ponds

Date: April 22, 2019

To: Millie Heffner, Water Rights Bureau Chief

From: Melissa Brickl, Hydrologist, Kalispell Water Resource Office
Mike Roberts, Hydrologist, Water Management Bureau
Dave Amman, Hydrologist, Water Management Bureau
Aaron Fiaschetti, Hydrologist, Water Management Bureau

The purpose of this technical memorandum is to describe the standard practices DNRC uses to calculate physical availability of surface water for ponds. This standard practice also is followed to evaluate physical availability as part of an evaluation of adverse effect of a proposed ground water application that depletes a pond. Separate technical memoranda describe standard practices for calculating physical availability of surface water for ponds in ephemeral drainages.

Determination of Physical Availability

The following are methods used to evaluate physical availability:

1. Existing ponds fed or drained by surface water
   - Streamflow measurements of either the inflow and/or outflow, or
   - Pond volume

2. Existing ponds fed or drained by ground water
   - Methods described in the Physical and Legal Availability of Ground Water memorandum for estimating physical availability of groundwater, or
   - Pond volume

3. Proposed ponds fed by surface water or ground water.
   - Streamflow measurements on the source of supply for surface water, and/or
   - Methods described in the Physical and Legal Availability of Ground Water memorandum for estimating physical availability of groundwater, or
   - Pond volume

Sources of Information

Information for use in calculating physical availability of surface water for ponds:

1. U.S. Fish and Wildlife Service National Wetlands Inventory Wetland Mapper (https://www.fws.gov/wetlands/Data/mapper.html). The mapper displays wetland type and extent using biological definition of wetlands. It can provide information on the open surface area of a wetland/pond/lake for average water years.

2. Montana Fish, Wildlife and Parks, Montana Fisheries Information System (FishMT) contains biological/physical data and management information pertaining to each water body in the state of Montana. Some examples of information available are lake elevation at full pool, surface area, maximum depth, and shore length.

3. Lake bathymetry GIS layer available from the Montana State Library Geographic Information Clearinghouse or through the FishMT interactive website can be digitized to provide a lake/pond volume.

4. Chapter 12 in Schneider (2000) provides examples of pond volume calculations.

5. Engineering Field Manual, US Department of Agriculture Soil Conservation Service, (USDA, 1979) provides pond design information.

Quantifying Pond Volume

Below is a summary of the different methods and/or resources DNRC uses to quantify the volume of water physically available in a pond. The DNRC Standard Practice is to use the equation that most appropriately matches the available data (i.e.- if only minimal data is available use equation 1, if more detailed data exists use equations 2 or 3).

1. Standard equations for estimating a man-made or natural pond volume:

   Dam: **Surface Area × Max Depth × 0.4**

   Pit: **Surface Area × Max Depth × 0.5**

   - The full pool surface area of a **man-made** pond is used to quantify the volume of the pond.

   - The surface area of a **naturally-occurring** pond is the average of values determined from aerial photographs for dry, normal and wet years.

2. Method for Estimating the Volume of an Excavated Pond (Engineering Field Manual, US Department of Agriculture Soil Conservation Service, June 1979, p 11-44). The slope of the lake bed, bathymetric or survey data aides in this calculation.

   The volume of an excavation can be estimated using the prismoidal formula:

$$V = \frac{(A + 4B + C)}{6} x \frac{D}{27}$$

   V = volume of excavation, in cubic yards
   A = Area of excavation at the ground surface, in square feet
   B =Area of the excavation at the mid-depth point (1/2D), in square feet
   C = Area of the excavation at the bottom of the pond, in square feet
   D = Average depth of the pond, in feet
   27 = Factor converting cubic feet to cubic yards

3. The following two methods provide equations for calculating lake/ reservoir/pond volume when bathymetric data are available. For further information see chapter 12 of Schneider (2000):

Method 3-1:

The formula in solid geometry for calculating the volume of a frustum of a circular cone has been applied by limnologists and fisheries biologists to compute the volume of a lake. This formula is:

$$V = \frac{1}{3} H\left(A_1 + A_2 + \sqrt{A_1 \times A_2}\right)$$

Where: V = volume of water;

H = difference in depth between two successive depth contours;

A_1 = area of the lake within the outer depth contour being considered;

A_2 = area of the lake within the inner contour line under consideration.

The procedure consists of determining the volumes of successive layers of water (frustums), and then summing these volumes to obtain the total volume of the lake.

Method 3-2:

Another formula has occasionally been used for computing lake volume. This method is employed by engineers for computing reservoir volumes, and is derived from the "end-area formula" sometimes applied to find the volume of prismoidal forms. The formula is:

$$V = \frac{1}{2} H(A_1 + A_2)$$

Variables and general procedures are the same as in Method No. 1.

Additional Considerations

The Department can ask the Applicant to quantify the max depth, survey the pond or construct a bathymetric map by using a tape measure and weight (more easily done on frozen lakes) or a fish-finder. The Department may conduct a site visit to investigate factors that may affect pond volume, such as dredging or filling.

References

Montana Department of Natural Resources and Conservation, 2016. Stream Discharge using Float-Area Method, 3 p.

Rantz, S.E., and others, 1982. Measurement and Computation of Streamflow: Volume 1. Measurement of Stage and Discharge. Geological Survey Water-Supply Paper 2175. 313 p.

Schneider, J.C. (ed.), 2000. Manual of fisheries survey methods II, with periodic updates. Michigan Department of Natural Resources, Fisheries Special Report 25, Ann Arbor.

USDA Soil Conservation Service, June 1979. Engineering Field Manual, p 11-44.

Technical Memorandum: Physical Availability of Surface Water Without Gage Data

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Technical Memorandum: Physical Availability of Surface Water Without Gage Data

Date: April 18, 2019

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The purpose of this technical memorandum is to describe the standard practices DNRC uses to calculate physical availability of surface water as required in §85-2-311, MCA (1)(a)(i) and ARM 36.12.1702 for streams where stream gage data are not available on the source of supply. Separate documents detail standard practices DNRC uses to calculate physical availability of surface water for sources with gage data, for ponds, and for ephemeral streams. Specific provisions of standard practices for surface water address:

- Estimating physical availability on ungaged streams
- Acceptable flow estimation methods
- Estimating physical availability where no acceptable regional regression equation is available

Estimating Physical Availability – Overview

§85-2-311, MCA (1)(a)(i) requires applicants prove by a preponderance of evidence that water is physically available at the proposed point of diversion in the amount that the applicant seeks to appropriate. If stream gage records are available for a source, ARM 36.12.1702(1) specifies that physical availability be demonstrated by the median of the mean monthly flow rates and volumes for the stream gaging station period of record during the proposed months of diversion. In the absence of gage records or other measurements by a public entity, ARM 36.12.1702(2) specifies that physical availability be estimated using an accepted estimation method in conjunction with discharge measurements to validate the estimation technique used. Department rule requires that streamflow measurements must be collected at least once per month during the period of diversion "validate" the estimation techniques. If it is not possible to take measurements every month due to high spring flow conditions or other limiting conditions as described below, the department may grant a variance to the measurement requirements (36.12.1702(4)). In addition

to validating estimation techniques, ARM 36.12.1702(6) provides that stand-alone measurements may be used upon approval by DNRC as evidence of physical availability.

Estimation Methods Used by DNRC

Methods DNRC uses to estimate physical availability on ungaged surface water sources include:

- *StreamStats*, a GIS application available from U.S. Geological Survey (USGS) that provides streamflow characteristics for ungaged sources based on regional regression equations and drainage area adjustment methods (USGS, 2015).
- USGS reports listed in ARM (36.12.1702(7)) that provide streamflow characteristics based on regional regression equations and drainage area adjustment methods for ungaged sources.

All estimation methods must be validated using streamflow measurements unless a variance is issued. The estimation of flow is considered valid when streamflow measurements fit within either standard errors reported for the regression equations used in the USGS reports listed in ARM 36.12.1702(7) ARM, or within the prediction intervals for the 90% confidence levels reported in *StreamStats*.

Models that could be used by an applicant in an alternative analysis include but are not limited to the Hydrologic Modeling System (HEC-HMS) (USACE, 2000), the Precipitation-Runoff Modeling System (PRMS-IV) (Markstrom et al, 2015), and Hydrological Simulation Program - FORTRAN HSPF (Mohamoud, 2012).

Estimation of Flow Using only Measurements

StreamStats excludes large regions of the state (northern and eastern tiers) from estimation due to a lack of viable station data. Similarly, USGS estimation techniques listed in the ARM do not apply to non-perennial streams, spring-fed streams, and smaller perennial streams with drainage areas less than the range specified by the USGS equations. In these cases, measurements may be used by themselves if the following considerations are met:

- Measurements are taken monthly during the proposed period of diversion, as prescribed in ARM 36.12.1702(3)
- Measurements are considered valid based on measurement technique, location, and site conditions during which the measurement was taken.
- Measurements are representative of average conditions for the source. The Department will examine the validity of measurements to ensure they are representative of typical conditions. If they are not, the Department will assess these measurements to ensure their proper context, relative to the water year. The Department may accept or deny the measurements as evidence of physical availability.

Streamflow Measurement Methods

Streamflow measurements used to validate estimation techniques or by themselves must follow DNRC approved methodology. The recommended method of measuring instantaneous streamflow is using a current meter (e.g. Flowtracker, Marsh-McBirney, Price AA) following the standard USGS discharge measurement methodology (Rantz, 1982). The float-area method, strictly adhered to as described by DNRC (2016) is an alternative to approximate streamflow if a current meter is not available. Other methods must be justified and approved by the Department. The Department may take measurements at an applicant's request depending on the availability of personnel.

Measurement frequency may be less than monthly for ephemeral or intermittent streams, or where conditions that physically prohibit access to measurement locations such as high spring flows or accessibility.

Miscellaneous measurements obtained from the approximately 3200 USGS and 150 DNRC stations not included with the active real-time USGS gages may be used in lieu of actual measurements if they are in locations pertinent to the physical availability analysis.

References

Bicknell, B.R., J.C. Imhoff, J.L. Kittle, Jr., A.S. Donigian Jr., and R.C. Johanson, 1997. Hydrological Simulation Program – Fortran (HSPF): User's Manual for Release 11, U.S. Environmental Protection Agency, National Exposure Research Laboratory, Athens, GA, EPA/600/R-97/080, 755 p.

Markstrom, S.L., R.S. Regan, L.E. Hay, R.J. Viger, R.M.T Webb, R.A. Payn, and J.H. LaFontaine, 2015. PRMS-IV, the precipitation-runoff modeling system, version 4: U.S. Geological Survey Techniques and Methods, book 6, chapter B7, 158 p.

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USGS, 2015. Montana StreamStats. Scientific Investigations Report 2015-5019.

Technical Memorandum: Surface Water Depletion for Regional Bedrock Aquifers

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Technical Memorandum: Surface Water Depletion for Regional Bedrock Aquifers

Date: September 16, 2019

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From: Attila Folnagy, Ground Water Hydrologist, Water Management Bureau
Todd Netto, Water Resource Specialist, Glasgow Water Resources Office
Mark Elison, Deputy Manager, Billings Water Resources Office

The purpose of this technical memorandum is to describe procedures for determining where appropriations under §85-2-311, MCA for ground water permits and §85-2-402, MCA for ground water changes from regional bedrock aquifers have the potential to deplete surface water sources and adversely affect existing water rights. The following discussion clarifies where the Department will consider surface water depletions from ground water pumping in consolidated bedrock aquifers as part of a standard evaluation of a ground water appropriation. Aquifers considered in this memorandum include all consolidated bedrock aquifers stratigraphically below the Bear Paw Shale. The standard practices DNRC follows to calculate net depletion from ground water pumping are described in a separate technical memorandum. This standard practice for regional bedrock aquifers also incorporates the results from the Madison Group Aquifer Guidance Memo which identifies surface water depletion from ground water pumping in the Madison Group Aquifer.

Net Depletion Background

Net depletion of surface water resulting from ground water pumping described in a related technical memorandum is the calculated volume, rate, timing, and location of reductions to surface water flow resulting from a ground water pumping. Net depletion is calculated by DNRC by:

1. developing a hydrogeologic conceptual model
2. identifying potentially affected surface waters,
3. calculating monthly consumption, and
4. modeling monthly net depletion.

Note: The Madison Group Aquifer Guidance Memo cited here contains identical text as the document previously cited in the Aquifer Test Reports under the "Draft Madison Group Aquifer" moniker. The latter, incorrectly cited as published in 2014, contained a "DRAFT" watermark on the first page. The Madison Group Aquifer Guidance Memo does not have this watermark, but is otherwise identical.

The information presented in the following sections describes the general hydrogeologic conceptual model and procedures for identifying potentially affected surface waters for ground water pumping from regional aquifers in consolidated bedrock, primarily in central and eastern Montana.

Exclusions to this Guidance

This technical memorandum does not apply when regional bedrock aquifers are at or near the surface and may potentially impact local surface water sources. This technical memorandum does not supersede restrictions related to closed basins, controlled ground water areas, compacts, and/or administrative actions.

Determining Surface Water Depletion

To determine where surface water depletions are likely to occur due to withdrawal from a regional bedrock aquifer, a buffer region is drawn around formation outcrops of the source aquifer and around geologic structures that are likely to provide preferential flow pathways within the aquifer (Figure 1). The procedures described in this memorandum are similar to those in the Madison Group Aquifer Guidance Memo which identifies buffers around outcrop areas in which the Madison Group Aquifer is not considered hydraulically connected to surface water. Buffers delineated in this memorandum identify regions in central and eastern Montana where ground water appropriations in regional bedrock aquifers are considered to have no surface water connection for the purpose of standard evaluations of ground water appropriations conducted by the Department. If a new appropriation is located within a buffered area, new ground water appropriations will continue to be evaluated under the standard practices found in the related technical memorandum. New ground water appropriations outside the buffer are not considered to deplete surface waters unless there is information suggesting otherwise, including but not limited to hydrogeologic studies and geologic mapping in the area of interest. Site specific evaluations will be confirmed by a Department ground water hydrologist using the best available geologic structure information for the region.

Buffers Around Outcrops

In areas where an aquifer crops out at the surface, it is likely that ground water appropriations will result in decreased discharge from the aquifer to surface water. This probability decreases with distance from the outcrop as the aquifer lies deeper beneath overlying units. An outcrop buffer of 10 miles is based on the buffer distance used by the Department in the Madison Group Aquifer Guidance Memo. In areas greater than 10 miles from an aquifer outcrop, ground water pumping from regional bedrock aquifers are not considered to deplete surface waters unless there is evidence to the contrary.

Buffers Around Geologic Structures

Regional-scale geological structures have the potential to provide preferential pathways for propagation of drawdown to surface water due to ground water pumping. In general, increasing confining pressure at depth compresses fractures and reduces the hydraulic conductivity of geologic structures and, consequently, constrains propagation of drawdown to areas near outcrops. At shallower depths, pore pressures are less, fractures are more open, and hydraulic conductivities of geologic structures are much higher. Furthermore, regional-scale geologic structures are interconnected with more local scale geologic structures, creating fracture zones. A buffer of 10 miles is to be used for geologic structures. In areas greater than the buffer distance from a regionally significant geologic structure, barring any evidence to the contrary, the Department would not consider surface water depletions from ground water appropriations from that regional bedrock aquifer as part of a standard evaluation of applications for ground water appropriation.

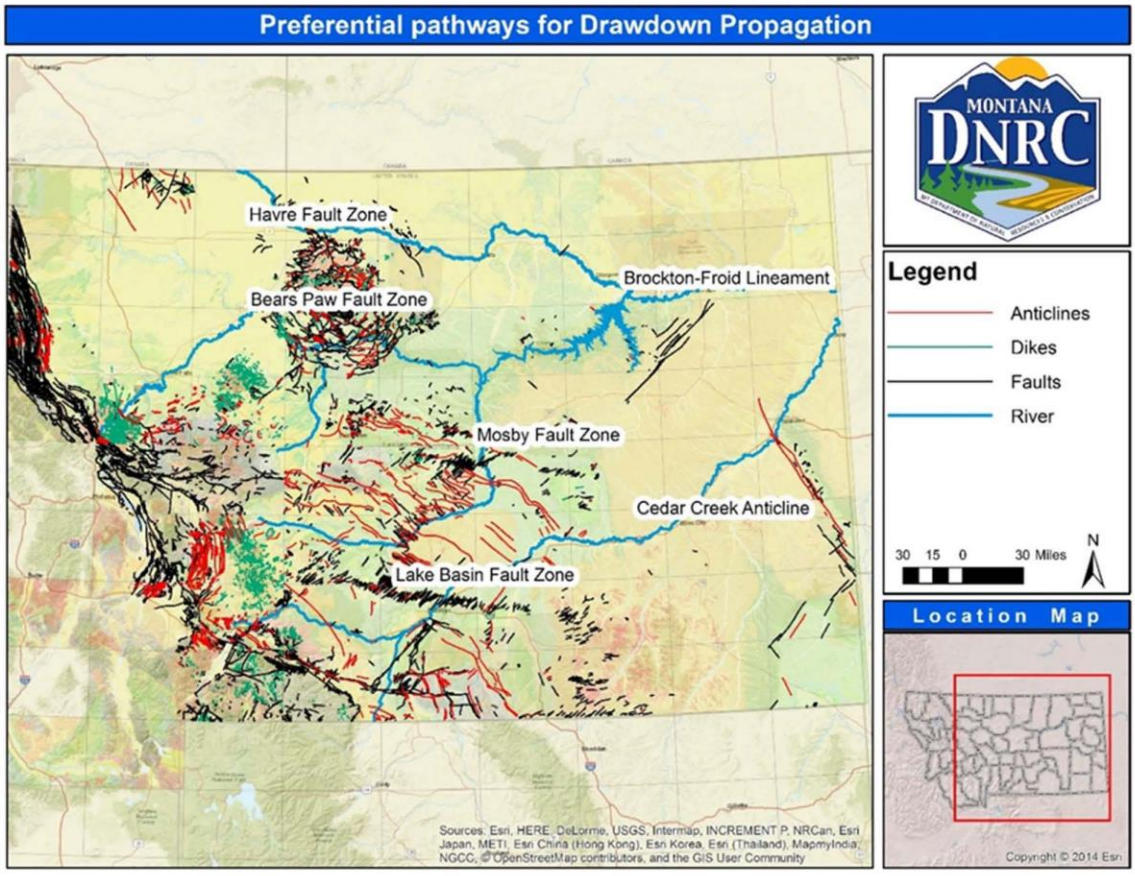

Figure 1: Preferential pathways for drawdown propagation (from geologic map 1:100,000 scale).

Additional information the applicant or objector can provide

If an applicant or objector disagrees with the Department's determination potentially affected surface waters for an appropriation of ground water from a regional bedrock aquifer, they have the option to provide the Department with additional information and analysis. The new data and analysis should include a hydrogeologic conceptual model of geologic structural control of ground water flow and discharge, and propagation of drawdown from the applicant's proposed well including a map showing where depletions to surface water are expected to occur.

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Technical Memorandum: Calculating Return Flow

Date: April 18, 2019

To: Millie Heffner, Water Rights Bureau Chief

From: Russell Levens, Hydrologist, Water Management Bureau
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Brent Zundel, Hydrologist, Bozeman Water Resource Office
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The purpose of this technical memorandum is to describe standard practices DNRC uses to calculate return flows to evaluate adverse effect criteria for certain changes of use under §85-2-402, MCA. The practices described here also may be part of an evaluation of net depletion of surface water for ground water permits under §85-2-311, MCA, and subject to §85-2-360, MCA, where return flows are modeled separately from groundwater withdrawal. A separate technical memorandum describes the standard practices DNRC uses to calculate net depletion from ground-water pumping.

DNRC policy on changes in method of irrigation (Davis, 2015) and return flows analysis in general (Davis, 2016) specifies instances when the Department will consider changes in return flows or the need for a detailed analysis of return flows. The 2015 policy memo specifies how DNRC reviews changes of use under §85-2-402, MCA that involve a change in method of irrigation. This policy limits the instances when DNRC will conduct a detailed return flow analysis to those where historically irrigated acres are retired. The 2016 policy memo specifies that the Department will not develop a detailed return flow analysis for change authorizations without an objection if:

a. return flows will enter back into the source where they have historically returned upstream of or at the location of the next downstream appropriator; or,
b. water is left instream so historically diverted flows are available during the historic period of diversion either below the point of diversion or where return flows historically returned to the source.

DNRC also may not develop a detailed return flow analysis where water is physically and legally available on sources of supply located in basins open to new surface water appropriations or where existing water rights on a source are limited to wastewater rights.

Identifying the likely receiving stream for historical return flows and an evaluation of the next downstream appropriator is necessary to determine whether a return flow analysis will be prepared. For shallow unconfined alluvial aquifers typically found along most streams, the receiving stream is determined by proximity to the historical place of use. There frequently are multiple streams located at different distances from the place of use that may receive return flows; however, for the purposes of determining whether a return flow report must be prepared, the most likely receiving stream is identified by evidence of hydraulic connection and procedures patterned after those developed by the Province of British Columbia (2016).

Return Flow Analysis

Return flow is that part of a diverted flow which is put to beneficial use and is not consumed and returns to a surface water source. Return flow does not include conveyance losses, application consumptive losses, or crop consumptive losses. An evaluation of return flows for a change of use generally requires separate calculations for historical and changed conditions to determine the net effect of the proposed change. When examined as part of a net depletion evaluation, a separate return flow evaluation is required (a) when the place of use is located at a different distance from a depleted reach than a proposed well or (b) where return flows accrete to a different aquifer than the source aquifer of the proposed well. When a separate return flow analysis is conducted, net depletion is calculated by subtracting return flows from depletions caused by pumping the full withdrawal at the well.

Return flows are evaluated by:

1. developing a hydrogeologic conceptual model,
2. identifying receiving stream reaches
3. calculating monthly volumes not consumed by beneficial use(s), and
4. modeling the monthly accretion of return flows.

The standard practices for evaluating return flows are generally believed to be adequate to provide substantial credible evidence necessary to evaluate criteria under §85-2-402, MCA and §85-2-311, MCA. DNRC may deviate from standard practices for evaluation of return flows if an applicant provides credible information to support a different evaluation. Additional information provided by an applicant might refine the hydrogeologic conceptual model, support delineation of different receiving stream reaches, justify different consumption calculations, and/or support more detailed modeling. DNRC will assess the value of additional information and justify whether to deviate from the standard practice.

Receiving Reach

The receiving stream is determined by proximity and evidence of hydraulic connection to ground water. Similar to depletion of surface water by ground water pumping, mounding beneath irrigated fields propagates in all directions independent of ground water flow rate or direction and generally does not depend on surface topography (Theis, 1938; Leake, 2011). Return flows may accrete to more than one receiving reach or to a different stream than the source water is diverted from.

Hydraulic connection of surface water(s) to an unconfined aquifer that lies beneath an irrigated place of use is based on an iterative consideration of proximity and comparison of ground water elevations relative to streambed elevations of receiving reaches. Hydraulic connection of individual stream reaches to ground water is evaluated by comparing streambed elevations to static ground water elevations measured in wells less than 50 feet deep and within 1,000 feet of surface water or from published water table maps. Surface water within that area is considered hydraulically connected to the source aquifer if static ground water elevations are above or within 10 feet of the elevation of the stream bed.

Return flows are apportioned between multiple receiving surface water reaches generally following procedures described in Section 3.2 of a guidance document developed by the Province of British Columbia (2016) for determining the effect of ground water diversion on specific streams. Return flows accrete to surface water in a manner that is analogous to pumping wells depleting surface water and thus, the same methodology is applicable. Return flows are apportioned through an iterative process based on inverse-distance squared stream weights. Once an initial set of streams has been identified, calculated stream weights are assigned. These weights represent the percent of return flows assigned to individual streams and sum to one. If any of the streams initially evaluated have scaled weights less than 0.1, representing less than 10% of total return flows attributed to that source, they are eliminated from consideration and the weights are recalculated for the remaining potentially affected sources, with the sum of all final weights equal to one. This is done to focus accounting of return flows on the most likely affected surface waters.

Calculation of Monthly Non-Consumed Volumes

Monthly non-consumed volumes, as they pertain to return flow, are determined by calculating the difference between the volume of water applied to a field and the volume of water consumed by the crop plus irrecoverable losses at the field (ARM 36.12.1902(17)). Calculation of monthly applied, consumed, and non-consumed volumes begins with the calculation of crop consumption, which is equal to the net irrigation requirement (NIR). The NIR is obtained from the consumptive use rules in ARM 36.12.1902 or derived from evidence of historical use submitted on a Historic Use Addendum. Monthly NIR values are calculated using the Irrigation Water Requirement (IWR) computer program (NRCS, 2003) and inputs consistent with those used in the consumptive use rules - except where alternative information has been provided using the Historic Use Addendum (crop mix, end dates, etc.). These inputs, including net irrigation depth, carryover moisture, and beginning and end dates of crop growth are specified in the DNRC Historic Consumptive Use Methodology.

The monthly volumes of water applied to a field are calculated by dividing the NIR by the on-farm efficiency value obtained from Table 1. Irrecoverable losses consisting of evaporative losses not related to crop growth are calculated as a percentage of the applied volume: 5% for flood irrigation and 10% for sprinkler irrigation (see DNRC irrecoverable loss memorandum dated April 15, 2013). Once the volumes above have been determined, monthly non-consumed volumes are calculated by subtracting crop consumption and irrecoverable losses from field application volumes. These monthly non-consumed volumes are then used as inputs in the Department's return flow analysis.

Table 1. On-farm efficiency for use in estimating return flows

Irrigation Method	Efficiency
Sprinkler	0.70
Level Border	0.60
Graded Border (Design Slope = 0.1 – 0.4%)	0.70
Graded Border (Design Slope = 0.75 – 1.5%)	0.65
Graded Border (Design Slope = 3.0%)	0.60
Furrow (Design Slope = 0.1 – 0.4%)	0.70
Furrow (Design Slope = 0.75 – 1.5%)	0.65
Furrow (Design Slope = 3.0%)	0.60
Contour Ditch (Design Slope = 0.75%)	0.60
Contour Ditch (Design Slope = 1.5 – 3.0%)	0.55
Contour Ditch (Design Slope = 6.0%)	0.45
Wild Flood	0.25

Rate and Timing of Return Flows

The rate and timing of return flows to unconfined aquifers for historical and changed conditions are modeled using either the Well Pumping Depletion Model (WPDM) or the Alluvial Water Accounting System (AWAS) to simulate accretion of return flows to receiving surface water(s). WPDM and AWAS can be used to model accretions from a single location, represented by a recharge well, to one source with simple aquifer boundaries. AWAS allows multiple recharge wells to be modeled simultaneously, so it is typically the model of choice. Adjustments may be made to either program to simulate more complex conditions using the method of images (Ferris, et al., 1962) or other superposition techniques.

The basic inputs to WPDM and AWAS are transmissivity, specific yield, distance from recharge wells to the receiving reach, and, optionally, distance from other model boundaries to the receiving reach. Transmissivity is either derived from an applicant's or other representative aquifer test or by multiplying an estimate of hydraulic conductivity from Table 2 in Bear (1972) by aquifer saturated thickness, typically obtained from well logs. Based on Lohman (1972), a specific yield of 0.1 is the default value for modeling return flows. Distances from recharge wells

used to represent return flows or aquifer boundaries are the perpendicular distances to the receiving reach.

An additional model that may be used to assess the rate and timing of return flows is the Glover (1977) model. This model can be applied either through a direct reconstruction of Glover in spreadsheet form, or through the commercial Stream Accretion Model (SAM). Great care is taken to only apply the Glover model to the very restrictive model geometry of a bounded alluvial aquifer with specific input requirements. While its simplicity is appealing, one important restriction of the Glover model is that it represents uniform recharge across the full width of the alluvial aquifer and therefore, is not applicable to places of use that overlay only a portion of the aquifer. Its simplicity is appealing, but care is taken not to misapply the Glover model. Inputs to the spreadsheet reconstruction of the Glover model are the same as the other models with the exception that aquifer width equal to twice the 1/2 width of an alluvial aquifer between the receiving reach and aquifer boundary is used instead of the distance values in the other models.

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Glossary

Groundwater mound – increase in the elevation of a water table that results from downward percolation of water applied for irrigation but not consumed.

Hydraulic conductivity – the capacity of a unit thickness of an aquifer to transmit water per unit width and unit gradient.

Hydraulic gradient – change in groundwater level per unit distance in the direction of groundwater flow.

Specific yield – measure of the amount of water released from or taken into storage in an unconfined aquifer in response to lowering or raising of the water table.

Transmissivity – the capacity of the full thickness of an aquifer to transmit water per unit width and unit hydraulic gradient.

Technical Memorandum: Pond and Wetland Evaporation/Evapotranspiration

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Technical Memorandum: Pond and Wetland Evaporation/Evapotranspiration

Date: November 8, 2019

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A pond and wetland working group was established by the Water Rights Bureau of the Montana Department of Natural Resources and Conservation (Department) Water Resources Division to recommend procedures for estimating surface water evaporation (evaporation) from ponds and evapotranspiration (ET) from wetlands for water right permit (Forms 600) and change applications (Forms 606). The following discussion details reference sources of pond evaporation, clarifies when to use net versus gross evaporation or ET, and identifies specific estimation procedures to be used. The following discussion does not include methods for determining the diversion required to maintain a pond or wetland.

See separate guidance and FAQs available on the Water Rights Bureau Internet site to determine when a permit or change is needed and the following methods apply.

When to Use Net vs Gross Evaporation (Open Water)
Except for Notices of Completion for Groundwater Development (Form 602), evaporation from ponds and ET from wetlands should be evaluated using net evaporation (accounting for precipitation). This is consistent with how the Department evaluates irrigated crops, where the net irrigation requirement is used to determine consumptive use.

Net Evaporation is calculated on a monthly timestep by subtracting monthly average precipitation from monthly estimates of gross evaporation. Annual estimates of net evaporation are calculated as the sum of the positive monthly net evaporation values. Average precipitation and gross evaporation data should be for matching locations, periods of the year, and periods of record. Average precipitation, not to be confused with effective precipitation from IWR, can be

found at the Western Regional Climate Center and the National Centers for Environmental Information. Gross evaporation is evaluated following the methods described in the following sections of this document.

The Department should use gross evaporation in water use calculations for Notices of Completion of Groundwater Development (Form 602) because this type of water right is exempt from review of statutory criteria relating to physical availability, legal availability and adverse effect. Furthermore, there is no means for objection to 602s by potentially affected water rights owners nor any immediate means to mitigate potential effects once a pond or wetland is constructed under a 602.

Sources of Information

Evaporation from open water from shallow water bodies such as ponds and wetlands should be calculated using methods found in the Potts (1988) and SCS (1974). Methods specifically developed for deep water bodies should not be used because shallower water bodies maintain higher water temperatures than deeper water bodies, such as reservoirs, at similar locations. This is mainly due to higher concentrations of solar heat absorbing vegetation, a thinner water column to filter solar heat, and lower thermal mass to offset daytime solar warming. Evaporation standards set forth in ARM 36.12.116 are a mix of deep and shallow water body methods. Accordingly, not all methods are appropriate for estimating pond and wetland evaporation.

Evaporation data collected by a standard USGS evaporation pan is an acceptable alternative to the Potts or SCS documents, but is less reliable. Pan data are often not collected during winter months, which results in gaps that disqualify annual and winter month estimates. The methodologies in both the BLM's (1997) document titled "Joint Technical Working Group Report for Water Rights Compact Between the State of Montana and the USDI BLM 1997" and the Meyer (1942) document titled "Evaporation from Lakes and Reservoirs, a study based on 50 years of weather bureau records" are referenced in ARM 36.12.116, but are not recommended for use on ponds or wetlands as they provide evaporation standards for large reservoirs.

Wetland ET can be converted from Net Irrigation Requirements (NIR) for alfalfa calculated by the Irrigation Water Requirement Program (IWR) (NRCS, 2003) using coefficients from Allen et al. (1994).

Pond and Wetland Evaporation (Open Water)

Monthly evaporation for ponds and wetlands that dry up outside the irrigation season can be calculated from the NOAA weather adjusted Penman/Linacre (P/L) for the months where the Net Irrigation Requirement from the IWR Program is non-zero. Take care to use the adjusted P/L which is 75% of the P/L estimates described in Potts. Data from the SCS document also can be

used by distributing annual evaporation values by month according to the monthly percentages produced by the adjusted P/L procedure.

Monthly evaporation for ponds and wetlands that do not dry up outside the irrigation season and do not ice over should be estimated from monthly calculations of adjusted P/L described in Potts for all months. Data from SCS (1974) also can be used by distributing annual evaporation values by month according to monthly percentages calculated from the adjusted P/L procedure. Again, take care to use the adjusted P/L for all calculations.

Monthly evaporation for ponds and wetlands that ice over should be calculated from the adjusted P/L procedure until permanent icing occurs. Data from the SCS document also can be used by distributing annual evaporation values by ice-free month according to monthly percentages calculated from the adjusted P/L procedure.

Wetland Evapotranspiration

Wetland ET should be calculated using an appropriate coefficient from Allen, et al. (1994) in combination with the NIR for alfalfa from IWR. The estimates for alfalfa should correspond to NIR estimates from IWR for flood irrigation systems, consistent with the method described in the "Historic Consumptive Use Methodology" and "DNRC's Use of the Irrigation Water Requirements (IWR) Program". NIR values should not be reduced by management factors.

Not all areas of wetlands contain both wetland vegetation and standing or open surface water, but when they do simultaneously occur on the same piece of ground, both Wetland ET values and surface water evaporation values are additively used to determine consumptive use. Surface water evaporation for wetlands should be estimated using the procedures described above in "Pond and Wetland Evaporation" and added to wetland ET for each month.

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Montana Department of Natural Resources and Conservation

~ Guidance for Landowners and Practitioners Engaged in Stream and Wetland Restoration Activities ~

This document offers guidance for the development and implementation of wetland and stream restoration projects as they pertain to Montana water rights. These guidelines are not intended to offer official departmental policy nor do they serve as a substitute for administrative rules established through the rulemaking process. DNRC's intention in the development of these guidelines is to provide an educational resource to the public and restoration practitioners involved in the work of stream and wetland restoration efforts.

This document discusses restoration techniques in terms of whether or not they constitute a diversion, impoundment or withdrawal of a quantity of water for beneficial use, which is how the Montana Water Use Act defines an appropriation of water that requires a water right. This document only pertains to State of Montana water right issues and does not contemplate other aspects of private property rights or civil law. This document also does not contemplate permitting requirements in addition to those directly relating to Montana water rights, but other permitting information can be found here: http://dnrc.mt.gov/licenses-and-permits/stream-permitting

DNRC strongly encourages individuals engaged in restoration work to contact their local DNRC Regional Office staff to obtain assistance regarding water rights questions for specific restoration projects:

Billings: (406) 247-4415 Bozeman: (406) 586-3136 Glasgow: (406) 228-2561 Havre: (406) 265-5516 Helena: (406) 444-6999 Kalispell: (406) 752-2288 Lewistown: (406) 538-7459 Missoula: (406) 721-4284

Background:

There is concern that inappropriately assuming a water right is required for wetland and stream restoration projects, including beavery mimicry, might limit ongoing ecological restoration efforts. Conversely, there is concern that some projects described as restoration are not comporting with water right laws when water is artificially manipulated through diversion, impoundment, excavation, groundwater pumping, or other means. Some of these activities may require a water right and some may not.

Appropriations under Montana Law:

Article IX, section 3(3) of the Montana Constitution provides that all surface, underground, flood, and atmospheric water within the boundaries of the state are the property of the state for its people and are subject to appropriation for beneficial uses as provided by law. These constitutional provisions are the basis of state laws that mandate an individual acquire a water right when intentionally ***Appropriating*** water for a ***Beneficial Use***. There are various types of water rights, including but not limited to *Statements of Claim*, *Permits*, and *Groundwater Notices of Completion*

(aka groundwater exceptions to a permit or exemptions from a permit or 602 wells), but this principal is consistent throughout: a water right is required to appropriate water for a beneficial use in the State of Montana.

Montana Statute defines ***Appropriate*** to divert [through Means of Diversion], impound, or withdraw, including by stock for stock water, a quantity of water for a *Beneficial Use* (MCA 85-2-301(1)). The Administrative Rules of Montana further describes appropriations by defining ***Means of Diversion*** as the type of structures, facilities, or methods used to *Appropriate*, impound, or collect water. Examples include, but are not limited to the following: dike, dam, ditch, headgate, infiltration gallery, pipeline, pump, pit, or well (ARM 36.12.101(36)). ***Beneficial Use*** means a use of water for the benefit of the appropriator, other persons, or the public, including but not limited to agricultural, stock water, domestic, fish and wildlife, industrial, irrigation, mining, municipal, power, and recreational uses. *Beneficial Use* includes specific instances of instream flow to protect, maintain, or enhance streamflows to benefit the fishery resource; *Beneficial Use* includes aquifer recharge, mitigation, and aquifer storage and recovery projects (MCA 85-2-102(4)). The DNRC has determined as a matter of policy that some wetland projects constitute a beneficial use under the Montana Water Use Act, as wetland habitat is inextricably linked to the beneficial uses such as aquifer recharge and fish and wildlife. Furthermore, these laws assume that a water user has intent to put the water to beneficial use and intent to protect those uses, which is why water right uses are governed by prior appropriations for purposes of prioritizing among multiple water users.

Wetland and stream restoration projects that intentionally divert, impound, or withdraw a quantity of water through a human-controlled diversion for a beneficial use clearly require a water right. However, these types of projects are highly variable and diverse which can make them difficult to categorize with respect to water rights. Wetland and stream restoration projects often rely on human initiated alterations to the landscape and/or hydrology with the purpose of restoring or resetting the natural functionality of wetland and stream systems. Sometimes these alterations are very similar to activities commonly associated with appropriation and beneficial use and as a result require water rights. Because restoration methods are so diverse, these activities are neither entirely exempt from water right requirements nor collectively mandated to acquire water rights. This document outlines a number of specific restoration practices as they relate to water right requirements.

The necessity of a water right for a particular restoration project depends upon numerous factors. For this reason, DNRC recommends that you contact your regional office with any water right related questions regarding this guidance document. The fact that a water right may not be required for some restoration activities does not mean that the activity is legal. An activity that results in the waste of water, prevents water from moving to another person, or violates the Montana Water Use Act is illegal and may be subject to judicial enforcement proceedings initiated by the department or another water user. Section 85-2-114, -122, and -125, MCA. Furthermore, restoration projects may be subject to other permitting or regulatory requirements under Montana law. DNRC recommends that you consult the appropriate regulatory agency and seek additional counsel regarding non-water right issues associated with wetland and stream restoration projects.

Water Rights Information:

Depending upon the specifics of the project, it may be necessary or advantageous to secure a water right even on a temporary basis for some restoration projects. The Montana Water Use Act provides numerous methods for obtaining a water right to facilitate or enable restoration efforts on a temporary or permanent basis. For more information on seeking a groundwater certificate (602 form), new right to appropriate (85-2-301 MCA), temporary change in an appropriation right (85-2-407 MCA), short term lease of an appropriation right (85-2-410 MCA), temporary permit (85-2-311 MCA), or other means of ensuring restoration projects comply with regulations, please contact your regional DNRC office or refer to the "Water Rights in Montana Handbook" available online at http://dnrc.mt.gov/divisions/water/water-rights/docs/2014-water_rights_in_mt_handbook.pdf.

Wetland Projects:

For the purpose of this discussion, wetland projects are categorized in terms of *Creation [Construction]*, *Restoration,* and *Enhancement*.

Wetland *Creation* [*Construction*] is the construction of an artificial wetland on a site that was historically non-wetland. Their uses include, but are not limited to landscaping, wildlife enhancement, water quality improvement, and sewage treatment. These wetland projects will always require a water right since water is artificially controlled and diverted to a place-of-use to create artificial wetland features in areas where natural wetland features have not existed in the past. It is noteworthy that some wetland creation [construction] projects used for treatment of wastewater from a public sewage system may not necessarily require a water right specific to reusing wastewater [or purposed as wetland] but that the use of this water is still predicated on an existing water right.

Wetland *Restoration or Historic Restoration* is the rehabilitation of a degraded wetland or the reestablishment of a wetland so that soils, hydrology, vegetative community, and habitat are restored to a close approximation of the original *natural* condition that existed prior to modification to the extent practicable. The term "natural" is emphasized here because a restored wetland should have characteristics similar to other natural wetlands in the area. Pool depths, water conveyance, vegetation and wetland water period of impoundments should share similar characteristics to other wetlands in the area. In the long-term, restored wetlands should function entirely in the absence of artificial controls and diversions of water that intentionally appropriate water for wetland use.

Wetland *Enhancement* is the modification of an existing wetland that augments specific wetland characteristics. Some augmentations, such as the non-irrigated promotion of specific plant species, are unlikely to artificially control water and increase water consumption above and beyond natural levels. However, in some wetland enhancements, impoundments and excavations are used to deepen wetland pools, diversions and headgates are used to impound water for longer periods, or the artificial control of water is used to encourage a larger area of wetland vegetation. Any of these types of enhancements that ultimately increase the amount of consumed or diverted water use beyond natural levels, require a water right.

To determine whether or not a wetland project results in a natural, constructed, or enhanced wetland, it is essential to compare the final project design to local natural wetlands characteristics. Characteristics to consider may include relative standing water (pool) dimensions, wetland plant species composition, wetland periods-of-impoundment, baseflow streamflow outputs, elevation

profiles, and floodplain connectivity. Any wetland project (restoration) whose final design approximates the natural characteristics of adjacent natural wetlands or approximates something smaller in magnitude does not require a water right. Any wetland project that results in deeper than normal wetland pools, higher in elevation water profiles, longer than typical periods of impoundment, curtailment of normative streamflow outputs, or diminished connection to the floodplain are wetland projects (enhancement or creation) that are more likely to require a water right. Wetland project designs should include descriptions of these characteristics as they pertain to water right demands.

It is worth looking at some specific techniques associated with wetland restoration projects, as they relate to water rights:

1. Excavations – The removal of fill (soil and rock) that was historically used to level and dry wetland areas so that they could be repurposed, through excavation, does not typically require a water right so long as the final wetland structure approximates natural characteristics. In contrast, an excavation that creates a wetland that will not be connected to a floodplain or not be located in an area that historically contained wetlands will require a water right. An excavation that results in the enlargement of a natural wetland or the enhancement beyond natural dimensions of a wetland will require a water right. Pool deepening beyond natural wetland conditions through excavation requires a water right.

2. Diversion – Any wetland that uses water sourced from a dike, dam, ditch, headgate, infiltration gallery, pipeline, pump, pit, or well will require a water right. [Groundwater Certificates (form 602), also known as exceptions to permits, are a type of water right]

3. Impoundments – Wetlands naturally impound water through natural depressions in the landscape and/or the existence of hydric soils that absorb and store water during periods of high flow and precipitation. These types of natural impoundments result in wetland associated aquifer recharge and storage and do not require a water right. In contrast, wetlands that use human-created berms, human-created dams, and dikes that result in wetlands that are perched in excess of elevation profiles of natural wetlands in the local area, require a water right for those portions of the wetland that are in excess of a natural wetland formation, as they are "enhanced wetlands" as compared to "natural wetlands." All impoundments that result in "created wetlands" require a water right for the entire appropriation.

4. Removal of Drains – Many wetlands have historically been converted to agricultural land through the process of installing drain-ditches to remove wetland impounded water thereby converting wetland hydric soils to agricultural soils and converting wetland vegetation to agricultural crops. Restoration of drained wetlands often involves elimination of drains that can include the installation of drain-plugs, the filling of drain-ditches, removal of drain tiles, or otherwise causing cessation of the draining of soil and the eventual promotion of hydric soil development. This activity typically does not require a water right. However, activities that affect the water availability or supply of other water users may result in other types of private property liability issues

5. Wetland Vegetation Planting, Seeding, and Establishment – Wetland plant evapotranspiration (ET) is part of a natural system, but some restorations projects require temporary irrigation of newly seeded, planted, and waddled vegetation during the first years of plant establishment after a restoration action has occurred. So long as water is being applied for the establishment of what will become naturally occurring wetland plants associated with a

restoration activity, and the resulting consumptive use is not more what will be the naturally occurring ET of the wetland vegetation after it becomes established, no water right is needed.

Stream Restoration Projects:

Stream or river restoration projects involve activities intended to restore degraded ecosystems to a stable, healthy condition. Channel restoration, floodplain reconnection, the addition of channel structural complexity, bank stabilization, riparian planting and seeding, dam removal, fish passage construction, biological restoration, beaver dam analogues and flow augmentation are discussed here. Stream restoration typically does not include the protection of water under the Prior Appropriations Doctrine.

1. Channel Restoration – Channel restoration or modification is typically used to address channels degraded from down-cutting/incising, widening, artificial braiding, irregular lateral scour, or other impacts to channel morphology. Channel restoration can include full re-sculpting and grading of the channel, installation of cross-vanes or other water velocity reduction structures, engineered log jams, or other channel features designed to raise the stream bed elevation of incised channels and restore floodplain and hydraulic connectivity. Channel restoration does not include channel modifications designed to improve diversions or impoundments of water for withdraw or instream protection under the Montana Water Use Act. Accordingly, channel restoration activities typically do not require a water right. Some grade control structures, developed to address channel incision for example, result in the formation of low velocity backwater and pool areas. Generally speaking, in-channel grade control structures that pool or pond less than 0.1acre-foot of water will not require a water right.

2. Adding Channel Structural Complexity – This category of restoration activity often overlaps with channel restoration, and may use engineered log jams, root wads, and the insertion of large woody debris to provide slow water habitat and promote scour pool formation. The objectives are typically more focused upon improving aquatic habitat conditions for fish and other aquatic organisms as opposed to channel restoration which is typically designed to address issues of high flow energy and undesirable channel meandering. As far as water rights are concerned, the same principles apply as those articulated in the channel restoration section.

3. Beaver Analogues - The construction of beaver dam analogues generates approximations of naturally occurring beaver dams and beaver ponds, done in a manner intended to also promote the channel stability, diverse aquatic habitat conditions, flow energy dissipation, floodplain connectivity, and other benefits associated with naturally occurring beaver formations. These features are typically deformable grade structures that are not entirely water tight allowing for fish passage both upstream and downstream as well as the conveyance of base streamflows. They may include dam anchors of large buried logs that are incorporated into the dam and are typically constructed from biodegradable materials and designed to inundate as well as incorporate flow deposited cobble, gravel, and other non-organic materials. So longs as beaver analogues do not use control gates, culverts, headgates, ditches, or pipelines, they typically do not require a water right.

If installing a series of structures, deformable or otherwise, within close proximity of each other, it is highly recommended that you discuss project specifics with your regional DNRC office. Projects that pool or pond more than 0.1acre-foot of water per structure or per series of structures in close proximity may require a water right.

4. Bank Stabilization - Bank stabilization takes many forms, all of which tend to focus on the armoring of stream and river banks. Projects focused on the installation of hard- and bio-engineered structures typically do not have any water rights requirements.

5. Riparian Vegetation Planting, Seeding, and Establishment – Riparian plant ET is part of a natural system, but some restorations projects require temporary irrigation of newly seeded, planted, and waddled vegetation during the first years of plant establishment after a restoration action has occurred. So long as water is being applied for the establishment of what will become naturally occurring riparian plants associated with a restoration activity, and the resulting consumptive use is not more than what will be the naturally occurring ET of the riparian vegetation after it becomes established, no water right is needed.

6. Dam Removal – Any removal of human-made dams will likely involve water rights, as all legally operating existing dams are required to have obtained a water right for their use and those water rights must be considered when decommissioning a dam. It is necessary to identify each and every existing water user who is legally entitled to the continuation of the operation of any dam being removed, as each of those water users may have unique claim to title and use that needs to be addressed before dam removal.

7. Fish Passage Construction – Dedicated fishways, fish passages, or fish ladders are similar to side-channels of a river. They only serve to route water and therefore do not require a water right.

8. Biological Restoration – Biological restoration is the restoration of biological organisms and focuses on the manipulation of species composition with actions that aide the desirable or removal of undesirable organisms. Biological Restoration projects typically do not involve water rights issues.

9. Flow Augmentation – Flow augmentation, as presented here, is the increase of instream flow through water transactions that include, but are not limited to: acquiring instream flow water rights and protecting water instream through prior appropriations, acquiring other purposed water rights and changing them to instream flow and protecting water instream through prior appropriations, storing/releasing water, and the establishment of diversionary reduction agreements. Any flow augmentation project that involves the acquiring of protectable [prior appropriations] water supplies, including storage, to purpose or repurpose for instream use always involves water rights, often of a complex nature.

Ditch Rights

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03-19-2012

Ditch Rights General Information

The Montana DNRC and in particular the Water Rights Bureau is often asked to answer questions pertaining to ditch rights. Ditch rights are rights of access across another's land to convey water. They may be mere licenses, or actual easements. Ditch rights and water rights are separate. A water right does not convey a ditch right and a ditch right does not convey a water right.

The Water Rights Bureau of the DNRC does not administer, maintain or enforce ditch rights. That said we have a responsibility to provide whatever useful information we have in order to best serve the public.

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- MCA 70-17-112 Interference with canal or ditch easements prohibited
- MCA 85-2-202 Road or ditch right-of-way
- MCA 7-31-4205 Procedure to close and fill ditch – notice
- MCA 7-31-4203 Open ditch declared nuisance
- MCA 85-2-414 Conduction of water
- MCA 85-5-106 Maintenance and repair of ditches or systems
- MCA 85-7-1933 Diversion of waters
- MCA 85-7-2211 Safety
- Chapter 8. Ditch Rights. Taken from: Montana Water Law Handbook, by Ted Doney, 1981, published by State Bar of Montana.

Recent opinions by the Montana Supreme Court may also be helpful in understanding ditch rights: *Sitz Angus Farms V. Dallaserra*, 2002 MT 295N (non-cite); *Byrum v. Andren et al*, 2007 MT 107; and *Musselshell Ranch Co. v. Joukova*, 2011 MT 217. These opinions can be found on the Montana Supreme Court's website, http://searchcourts.mt.gov/index.html

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Clark Fork Supplemental Memo

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MEMORANDUM

To: Bill Schultz, Missoula Regional Manager
Marc Pitman, Kalispell Unit Manager
Jan Langel, WRD Operations Manager
Terri McLaughlin, Water Rights Bureau Chief
Kim Overcast, New Appropriations Program Manager

From: John E. Tubbs, Administrator

Re: Permitting in the Open Clark Fork and Flathead Basins
Follow-up to June 9, 2008, Memorandum

Date: May 1, 2009

This memorandum is to clarify the direction I intended for applying the TRLC case[1] as precedent[2] for surface and ground water uses in the open Clark Fork and Flathead Basins. All applications for permits remain subject to requirements of MCA 85-2-311.

Above Reservation Boundary: (all of Basins 76I, 76J & 76K and that portion of 76L & 76LJ north of Reservation boundary)

- The TRLC case is not considered as precedent and therefore is not a consideration in evaluating issuance criteria for surface water or groundwater applications.

Below Reservation Boundary: (all of Basins 76M & 76N and that portion of 76L west of Reservation boundary)

Surface Water Sources

- For requested appropriations of 35 gpm or less and 10 acre feet of consumption per year or less, do not consider TRLC as precedent. TRLC is not a consideration in evaluating issuance criteria.
- For requested appropriations of greater than 35 gpm or greater than 10 acre feet of consumption per year, TRLC is considered as precedent and is a consideration in evaluating issuance criteria.

[1] Application for Beneficial Water Use Permit No. 76N 30010429 by Thompson River Lumber Co (2006).

[2] Precedent: An adjudged case or decision of a court, considered as furnishing an example or authority for an identical or similar case afterwards arising or a similar question of law. From Black's Law dictionary, Fifth Edition.

Ground Water Sources

- When net depletion to surface water sources is calculated to be 35 gpm or less and 10 acre feet per year or less, do not consider TRLC as precedent. TRLC is not a consideration in evaluating issuance criteria.
- When net depletion to surface water sources is calculated to be greater than 35 gpm or greater than 10 acre feet per year, TRLC is considered as precedent and is considered in evaluating issuance criteria.

Criteria Assessment: When TRLC is not a consideration in the evaluation, the following language should be added to the criteria assessment when evaluating applications in the Clark Fork and Flathead basins.

In regard to senior hydropower water rights, the facts in this application are distinguishable from those in *In the Matter of Application for Beneficial Water Use Permit No. 76N30010429 by Thompson River Lumber Co* (2006) (TRLC) concerning the Avista Company's water rights for Noxon Reservoir. Thompson River Company's proposed diversion on the Clark Fork was surface water immediately upstream of Avista's Noxon Reservoir that had an immediate calculable adverse impact on Avista's water rights and power production.

The proposed appropriation in this case is for ***[i.e. domestic lawn irrigation]*** more than ***[XX]*** miles upstream of Noxon Reservoir. Section §85-2-401, MCA, makes clear that an appropriator is not entitled under the prior appropriation doctrine to protect itself from all changes in condition of water occurrence. In this basin which is not closed to surface or ground water appropriations, priority of appropriation for a large hydropower right that may otherwise prohibit future upstream development in the basin, does not, pursuant to §85-2-401, MCA, include the right to prevent the decrease of streamflow or the lowering of a water table or water level if the prior appropriator can reasonably exercise their water right under the new conditions. Here, the Department finds that Avista's prior appropriation in this basin which has not been closed to appropriation by the Legislature does not include the right to prevent this appropriation where Avista can reasonably exercise its hydropower water right.

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03-19-2012

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FIRE SUPPRESSION: DO YOU NEED A WATER RIGHT?

Do you store water for the sole purpose of fire protection?

Do you store water in an open system (reservoir or pond)?

Will water stored in a closed system (cistern or enclosed tank) be used for purposes other than emergencies such as practice firefighting, washing trucks or equipment, etc.?

If you answered yes to either of the questions above, *a water right is likely required.* You should contact your local DNRC Water Resources Regional Office.

Billings:	406-247-4415	Bozeman:	406-586-3136
Glasgow:	406-228-2561	Havre:	406-265-5516
Helena:	406-444-6999	Kalispell:	406-752-2288
Lewistown:	406-538-7459	Missoula:	406-721-4284

Otherwise, the use of water for temporary emergency purposes, such as fighting a fire, is allowed without any prior approval from DNRC.

Montana Code Annotated Reference: 85-2-113(3) The department shall adopt rules providing for and governing temporary emergency appropriations, without prior application for a permit, necessary to protect lives or property.

Administrative Rules of Montana Reference: 36.12.105 Temporary Emergency Appropriations 1) A temporary emergency appropriation may be made without prior approval from the department, but the use must cease immediately when the water is no longer required to meet the emergency. 2) A temporary emergency appropriation does not include the use of water for the ordinary operation and maintenance of any trade or business.

DNRC 01/2011

DEPARTMENT OF NATURAL RESOURCES
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1520 EAST SIXTH AVENUE

STATE OF MONTANA

DIRECTOR'S OFFICE (406) 444-6699

HELENA, MONTANA 59620

RECEIVED
MAR 24 1986

MEMORANDUM

TO: Gary Fritz, Administrator
Water Resources Division

FROM: James M. Madden
Legal Counsel

APPROVED: Tim D. Hall
Legal Counsel

Post-it™ Fax Note 7671	Date	# of pages ▶
To Kim O.	From Scott D.	
Co./Dept.	Co.	
Phone #	Phone #	
Fax #	Fax #	

SUBJECT: Private Fish and Wildlife Appropriations under the Water Use Act.

DATE: January 22, 1986

ISSUE

Should the Department (DNRC) issue new water use permits or final certificates to individuals for private fish and wildlife purposes? Does the Water Use Act authorize individual appropriations for these uses? Does the Department of Fish, Wildlife and Parks (FWP) have any countervailing interests?

BRIEF ANSWER

Private appropriations for fish and wildlife purposes are authorized by the Water Use Act and its amendments. This is in accord with prior case law and with the legislature's intent to maximize the beneficial use of waters in Montana. The Act imposes two restrictions on these appropriations. First, private appropriations for fish and wildlife must involve some kind of a diversion, impoundment, or withdrawal of water. Second, proposed fish and wildlife apropriations must be measured against amounts reasonably needed for that use. Uses that cannot reasonably be quantified cannot be recognized as a right.

CENTRALIZED SERVICES DIVISION (406) 444-6700 | CONSERVATION DISTRICTS DIVISION (406) 444-2687 | ENERGY DIVISION (406) 444-6697 | OIL AND GAS DIVISION (406) 444-6675 | WATER RESOURCES DIVISION (406) 444-6601

The Department of Fish, Wildlife and Parks has statutory authority to supervise the fish and wildlife of the state, but FWP does not have the exclusive right to appropriate water for fish and wildlife purposes. However, in some private fish and wildlife uses, DNRC and FWP interests overlap.

The DNRC should issue rules defining acceptable private fish and wildllife uses. These rules should be preceded by DNRC study of the quantification problems inherent in these uses, and should be based on the DNRC's interpretation of its duties under the Water Use Act.

DISCUSSION

1. Private appropriations for fish and wildlife under the Water Use Act.

The plain language of the Water Use Act, Title 85, Chapter 2, MCA, appears to authorize private appropriations for fish and wildlife purposes. After July 1, 1973, no person may appropriate water except as provided by the Act. A person may only appropriate water for a beneficial use. §85-2-301(1), MCA. The Act defines "beneficial use" as:

> a use of water for the benefit of the appropriator, other persons, or the public, including but not limited to agricultural (including stock water), domestic, fish and wildlife, industrial, irrigation, mining, municipal, power and recreational uses . . .
>
> §85-2-102(2)(a), MCA (emphasis added)

Several other states have also statutorily approved fish and wildlife appropriations as beneficial uses of water. See Ariz. Rev. Stat. Ann. §45-141(A); Cal. Water Code §§ 1242, 1243, 1257; Colo. Rev. Stat. Ann. 37-92-103(4); North Dakota Code Ann. 61-04-01.1; Or. Rev. Stat. 537.170(3)(a); Tex. Rev. Civ. Stat. Ann. 7470, 7471; Wash. Rev. Code Ann. 90.14.031. See also R. Clark, Waters and Water Rights §19.3(c) p. 59 (1967), and Hutchins, v.I Water Rights Laws in the Nineteen Western States, p. 523-24 (1971). A noted commentator has concluded that fish and wildlife uses are undoubtedly "beneficial", as that term is used in western water law. Trelease, The Concept of Reasonable Beneficial Use in the Law of Surface Streams, 12 Wyo. L.J. 6, 11 (1957). No court decisions have been found holding otherwise although an early Utah case, applying a local rule that appropriations must "inure to the exclusive benefit of the appropriator", held that an individual could not irrigate public land to supply food for wild waterfowl. Lake Shore Duck Club v. Lake View Duck Club, 166 P. 300 (Utah 1917).

In 1936 the Montana Supreme Court recognized a private appropriative right for purposes of a swimming pool and fish pond. Osnes Livestock Co. v. Warren, 103 Mont. 284 (1936). With no discussion of the matter, the Osnes court ruled:

> If we assume it to be the fact that the Hudson brothers did nothing more with the water diverted than to use it for the purpose of maintaining a swimming pool or fish pond, it is not clear that such a use would not be a beneficial use and hence the basis of a valid appropriation.

Id. at p. 302, citing Kinney on Irrigation, §697; Cascade Town Co. v. Empire Water & Power Co., 181 F. 1011 (D. Colo. 1910), aff'd 205 F. 123 (8th Cir. 1913) (scenic falls are a beneficial use). In a more recent case, the Montana Court assumed that a diversion for a private fishpond was a "lawful appropriation", although the beneficial use question was not directly raised. Paradise Rainbow et al v. Fish and Game Commission, 148 Mont. 412, 418-19 (1966). See also Quigley et. al. v. McIntosh, 110 Mont. 495 (1940). At the time these cases were decided, Montana statutes did not define beneficial use but simply required that an appropriation be for some "useful or beneficial purpose". RCM 1947, 89-802. It was left to the courts to determine what were beneficial purposes.

The Osnes holding that a private fishpond is a beneficial use of water is probably still good law. Both the 1973 and pre-1973 statutes contain the requirement that appropriations be for a beneficial use. See §85-2-301, MCA; §89-802, RCM 1947. In adopting a statute, the legislature is presumed to have acted with knowledge of the judicial construction of previous similar statutes, and to have adopted that construction, unless the contrary is clearly shown in the language of the new statute. Ventura v. Montana Liquor Control Board, 113 Mont. 265 (1942). As a judicial construction of the term "beneficial use", Osnes thus remains valid. Moreover, the Osnes ruling seems to have been expressly incorporated in the Water Use Act's designation of fish and wildlife appropriations as beneficial uses. §85-2-102(2)(a), MCA. Arguably, Osnes' authorization of private fishpond appropriations is incorporated in the 1973 Act as well.

The legislative history available for the Water Use Act gives no indication of the legislature's intent on this issue. However, some perspective on the water law climate at the time of the 1973 Act may be provided by reviewing the transcripts of the 1972 Montana Constitutional Convention. See Verbatim Transcript Vol. V pp. 1301-1351. One proposed constitutional subsection would have listed beneficial uses of water, and was

similar to the present §85-2-102(2)(a), MCA. The proposed subsection stated in pertinent part:

> Beneficial uses include but are not limited to domestic, municipal, agriculture, stockwatering, industry, recreation, scenic waterways, and habitat for wildlife, and all other uses presently recognized by the law, together with future beneficial uses as determined by the Legislature or courts of Montana.

Id. at p. 1312. (emphasis added). There was considerable debate at the convention as to whether the proposed recreational and wildlife uses might usurp older, more traditional uses. Nevertheless, the delegation was in agreement that downstream states might soon obtain prior rights to Montana's unappropriated water. An extensive list of beneficial uses was seen as a means of maximizing Montana's claim to the unused waters in the state. See id. at pp. 1316, 1319, 1328, 1334. Moreover, it was clear that the proposed subsection was intended to authorize individual filings for recreational and wildlife appropriations. Id. at p. 1315.

The proposed constitutional listing of beneficial uses was ultimately deleted, in part because of disagreement as to how or whether to rank the uses, and in part based on the realization that the matter was more properly one for the legislature. Id. at p. 1334. The constitutional delegation clearly anticipated that the next legislature would likewise be interested in protecting Montana's water against downstream states, and thus would expand the list of uses for which Montana water could be appropriated. Id. at pp. 1334-35. And in fact, the 1973 legislature incorporated into the Water Use Act a definition of beneficial use very similar to the proposed constitutional subsection. §85-2-102(2)(a), MCA.

The 1973 legislature probably shared the water law concerns of the 1972 constitutional delegation. Thus, one purpose of the Water Use Act was to authorize a broad range of acceptable uses for Montana water. To prohibit private parties from making appropriations for fish and wildlife would not be consistent with that purpose.

In any case, private appropriations for fish and wildlife uses are consistent with the plain language of the Water Use Act and its amendments. This fact, in the absence of indications to the contrary, provides sufficient legal basis for concluding that such appropriations are authorized by the Act.

The Water Use Act does place two restrictions on private appropriations for fish and wildlife. First, as defined in the

Act, "appropriate" means to divert, impound, or withdraw a quantity of water. §85-2-102(1), MCA. A special provision of the Act allows public agencies to claim water without a diversion, impoundment or withdrawal. §85-2-316, MCA. These special claims can take the form of reservations of water for existing or future beneficial uses, or of maintaining a minimum flow level or quality of water. It is clear, both from the Act's definition of "appropriate" and from the separate section allowing public agencies to apply for instream flows, that private individuals cannot make instream appropriations. See, In the Matter of the Application for Beneficial Water Use Permit No. 35527-s41H by Glenn H. and Lyla E. Lehrer, p. 1.2 (1984). Thus, private fish and wildlife appropriations require some kind of a diversion, impoundment, or withdrawal.

The requirement of a diversion or some other exercise of physical control over water in order to obtain a water right has been criticized. One commentator has observed:

> It was natural for our water laws to grow up with terminology which required a 'diversion' for beneficial use, because both placer mining and irrigation generally required it, and they were the only principal uses which concerned our courts and legislatures at the time that water law was developing.
>
> But now there are other uses which do not require a diversion, e.g., hydro-power. And some modern uses do not require impoundment or withdrawal either, e.g. all manner of water-based recreation: swimming, fishing, water skiing, gold mining, scuba diving and so on.

Stone, Montana Water Law for the 1980's, p. 51 (1981). Agruably, the true test of an appropriative water right is the application of the water to some beneficial use, not whether a diversion is employed. Nevertheless, the diversion requirement does reflect the possessory element inherent in a traditional appropriative right. See, Fullerton v. Cal. State Water Resources, 193 Cal.Rptr. 518, 522-23 (Cal.App. 1979). Further, nonpossessory water rights present special problems of notice and quantification, which may justify their receiving special treatment in the Water Use Act.

The second restriction imposed by the Water Use Act on private fish and wildlife appropriations results from the Act's requirement that water rights be quantified. Before a water use permit will issue, an applicant must prove, inter alia, that there are unappropriated waters in the source of supply in the amount requested, and that the proposed use will not harm prior

appropriators or interfere with other planned uses. §85-2-311(1), MCA. This section requires that the proposed use be measured against the existing water supply and the needs of other appropriators. Further, the Act prohibits the DNRC from issuing a permit for more water than can "be beneficially used without waste for the purpose stated in the application." §85-2-312(1), MCA. This section requires the DNRC to measure the proposed use against amounts reasonably needed for that use.

These sections of the Act make quantification of the use an essential step in the granting of a water right. This is in accord with the traditional rule that an appropriative water right extends only to the quantity of water that is in fact beneficially used. Huffine v. Miller, 74 Mont. 50 (1925). See also, Toohey v. Campbell, 24 Mont. 12 (1900); Allen v. Petick, 69 Mont. 373, 377-79 (1924) (beneficial use is the basis and limit of a water right; the amount that can usefully be put to the intended use is the limit of the right itself.) However, the permit procedures of the Water Use Act were also a response to an express constitutional mandate that the legislature provide for the "administration, control, and regulation of water rights" and "establish a system of centralized records". Article IX, section 3(4), 1972 Mont.Const. Thus, the Act was intended to implement a definitive water use system:

> The legislature declares that this system of centralized records recognizing and establishing all water rights is essential for the documentation, protection, preservation and future beneficial use and development of Montana's water for the state and its citizens and for the continued development and completion of the comprehensive state water plan.
>
> §85-2-101(2), MCA.

Quantification of rights is especially important to achieve the systematic documentation of water rights contemplated by the Water Use Act.

Appropriations for fish and wildlife are notoriously difficult to quantify, except in certain limited and carefully controlled situations. This quantification problem necessarily will restrict the scope of private appropriations for fish and wildlife under the Water Use Act. A use that cannot be quantified cannot become a right under the Act.

2. FWP Supervision over Fish and Game

It has long been the rule in Montana that the state "owns" its wild fish and game for the use and benefit of its citizens.

Heiser v. Severy, 117 Mont. 105 (1945); Rosenfeld v. Jakways, 67 Mont. 558 (1923). The Department of Fish, Wildlife, and Parks (FWP) has been given authority to supervise all the wildlife, fish, game, game and nongame birds, waterfowl, and the game and fur-bearing animals of the state. §87-1-201(1), MCA. Much of FWP's supervisory activity consists of licensing private and commercial activities that affect the state's fish and game resource. See, Title 87, chapter 2, MCA. A license is required not only for hunting, fishing and trapping, but also for any other activity involving the "possession" of wild fish or game:

> It is unlawful for any person to: (1) pursue, hunt, trap, take, shoot, or kill or attempt to trap, take, shoot, or kill any game animal, any game bird, or any fur-bearing animal or take, kill, trap or fish for any fish within this state or have, keep, or possess within this state any game animal, game bird, fur-bearing animal, game fish, or parts thereof, except as herein provided or as provided by the department . . .

§87-2-103(1), MCA (emphasis added)

Another statute also generally regulates possession of fish or game:

> It is hereby made unlawful for any person to purchase, sell, offer to sell, possess, ship, or transport any game fish, game bird, migratory game bird, game animal, or fur-bearing animal or part thereof protected by the laws of this state, whether belonging to the same or different species from that native to the state of Montana, except as specifically permitted by the laws of this state.

§87-3-111(1), MCA (emphasis added)

Aside from hunting and fishing, only a few kinds of wildlife "possession" are actually regulated by statute or FWP regulation. Regulations are promulgated for game farms (§87-4-401, et seq, MCA; 12.6.1501, et seq, ARM), menageries and zoos (§87-4-801, et seq, MCA; 12.6.1301, et seq, ARM), and fur farms (§87-4-1001, et seq, MCA; 12.6.1701, et seq, ARM). Restrictions also are placed on the captive breeding of raptors (§85-5-201, et seq, MCA; 12.6.1401, et seq, ARM). As a rule, existing FWP regulations concerning possession of wildlife focus on the possession of animals for commercial purposes. For

example, the licensing provisions for game bird farms expressly do not apply to "a person who owns, controls, or propagates game birds for purposes other than sale or conveyance." §87-4-902, MCA. (Nevertheless, any person that possesses migratory game birds for propagation needs state and federal permits. See, §87-2-807, MCA)

Considerably more extensive are FWP's statutes and regulations concerning private possession of wild fish. Owners of fish ponds must apply to FWP for a private fish pond license. §87-4-603, MCA. A significant limitation on private fishponds is that they must be located in artificial lakes or ponds. Id. The apparent purpose of this limitation is to avoid interfering with natural habitats and migration routes. See, Paradise Rainbow et. al. v. Fish and Game Commission, 148 Mont. 412, 416-18 (1966). FWP also restricts the rearing of fish in "live cages" in public waters. 12.7.301, ARM. The purpose of this regulation is "to protect the recreational and aesthetic use of such water from pollution, excessive private use, and the introduction of disease." §87-3-208, MCA. The effect of the foregoing restrictions is to substantially limit private use of natural streams for the purpose of cultivating fish.

Other statutes and rules also show the FWP's extensive regulatory presence in the fisheries area. Besides enforcing complex regulations concerning fishing methods, FWP supervises a number of state fish hatcheries, and has undertaken a fish planting program throughout the state. See, §87-3-202, MCA; 12.7.601-602, ARM. Also, to further its policy of preventing fish diseases, FWP has developed an inspection and certification procedure for imported salmonid fish or eggs. 12.7.501, ARM.

In summary, FWP has statutory authority to supervise the fish and wildlife of the state. General statutes prohibit the "possession" of any animal or fish except as permitted by statute or FWP regulation. Specific FWP regulations focus on the possession of wildlife for commercial purposes, although FWP has asserted broad regulatory jurisdiction over private possession of wild fish.

3. Policy Approaches

In setting a policy concerning private fish and wildlife appropriations, DNRC must act within the legal guidelines imposed by the Water Use Act. Two basic principles relevant here are:

1. Private fish and wildlife appropriations are a beneficial use of water under the Act. The DNRC is obligated to issue permits for these uses.

2. The Act requires that water use rights be quantified. The DNRC cannot issue a permit for a use that cannot reasonably be quantified.

These principles appear to conflict where, as with fish and wildlife appropriations, a recognized beneficial use is inherently difficult to quantify. This conflict simply reflects two disparate purposes of the Water Use Act: a) to maximize the use of Montana water by authorizing a broad range of beneficial uses, and b) to implement a definitive water appropriation statute, one that quantifies and documents all water rights.

At the outset it is clear from 1) and 2) that two approaches to private fish and wildlife claims are not legally sound. DNRC cannot deny permits on the grounds that private fish and wildlife appropriations are not beneficial uses. Nor can DNRC routinely issue permits for amounts as claimed, without determining that the claimed amount is reasonably related to the proposed use.

A second consideration in setting a policy in this area is the possibility of overlapping interests of DNRC and FWP in private fish and wildlife appropriations. FWP has supervisory authority over Montana's fish and wildlife resources, and in two instances FWP is granted special authority to claim water rights. First, FWP, as a public agency, is allowed to make claims for instream flows and water reservations. §85-2-102(1), 316, MCA. As noted above, private individuals cannot make instream appropriations for fish and wildlife or for any other purpose. Second, the legislature has designated FWP as the exclusive representative of the public for pre-1973 public recreational uses. §85-2-223, MCA. Nevertheless, nothing in the Water Use Act or in FWP's enabling statutes gives FWP the exclusive right to appropriate water for fish and wildlife purposes. On the contrary, as noted above, the Water Use Act by its plain language authorizes private appropriations for fish and wildlife. FWP statutes are consistent with allowing private appropriations for these purposes. For example, FWP licenses private fish ponds. §87-4-603, MCA.

FWP's interest in private fish and wildlife appropriations can be analyzed in either of two ways. First, it is arguable that the only activities for which a private fish or wildlife appropriation should be allowed are those activities specifically permitted and/or licensed by FWP (e.g., licensed fish ponds, game farms, game bird farms, zoos.) This approach is based on the statutes prohibiting "possession" of fish and game except as specifically provided by FWP statute and regulation. §§87-2-103(1), 87-3-111(1), MCA. DNRC's duty to quantify fish and wildlife appropriations will necessarily limit acceptable uses to those where some degree of <u>control</u> is exercised over the wildlife resource. If this control amounts to "possession" of wildlife, FWP statutes and regulations will apply. The advantage of this approach is simplicity: DNRC would grant fish and wildlife permits only for FWP-licensed activities.

However, it may be hard to justify this first approach if what DNRC requires to control or quantify fish and wildlife uses is not always "possession" as contemplated in the FWP statutes. As noted above, present FWP regulations concerning "possession" of wildlife focus on private ownership of animals, or possession of wildlife for commercial purposes. It may be hard for DNRC to argue that only in these cases can the beneficial use of water for wildlife reasonably be quantified.

A second approach is to recognize that FWP's interest in private fish and wildlife appropriations may vary depending on the use for which water is sought to be appropriated. Rather than weigh the FWP interest as well as assessing the quantifiability of the use for every permit application, some general observations can be made by class of use.

Fish. Private appropriations for fish would probably involve instream impoundments or diversions to artificial ponds. To achieve sufficient control to quantify the use, fairly substantial structures may be needed. At this point, the impact on the fish resource probably invokes the regulatory jurisdiction of FWP. FWP has in effect prohibited rearing fish in public waters or locating private fishponds on natural streams. §87-3-207, MCA; §87-4-603, MCA. Moreover, private artificial fishponds are required to be licensed.

Given FWP's extensive regulatory presence in fisheries, DNRC could justify limiting private appropriations for fish to activities licensed or approved by FWP. This approach would limit permit issuance to serious private fishery uses, which may be sufficiently controlled to aid DNRC in quantifying the use. This approach also properly recognizes the overlapping interests of FWP in these uses.

Wild Game. Appropriations for freely roaming wild animals, such as deer and elk, or coyotes and jackrabbits, or grouse and grosbeaks, may be impossible to quantify. Such animals can obtain water from numerous sources or from any point along a stream. Consequently, there may be little or no correlation between the existence or size of a private diversion and a benefitted wildlife population. If, after study, DNRC concludes that this is the case, it would be justified in declining to issue permits for watering wild game.

FWP does not extensively regulate the possession of wild game, although private game farms and zoos must be licensed. §87-4-401, et seq, MCA; §87-4-801, et seq, MCA. In these controlled situations, water use can probably be quantified. If so, DNRC should issue water permits for wildlife use in these cases.

Waterfowl. Private appropriations for waterfowl would probably consist of duckponds or other impoundments, either instream or offstream. Some state and federal regulations may apply in this area. Possession of migratory game birds for propagation purposes requires state and federal permits. See, §87-2-807, MCA. Ownership or control of nonmigratory game birds for sale requires a game bird farm license from FWP. §87-4-901, MCA. This licensing requirement does not apply when birds are owned, controlled or propagated for noncommercial purposes, §87-4-902, MCA, although the bird owner is required to receive written authorization of exemption from FWP. Section 901 and 902 game bird farms probably would be quantifiable beneficial uses.

Duckponds where the birds are privately owned and controlled appear to fall under FWP supervision, either under sections 901 or 902 of Title 87, chapter 4, MCA. The ownership of the ducks is probably sufficient to create a quantifiable use. Duckponds constructed to attract and sustain wild birds are outside present FWP regulations. These uses may be quantifiable, or they may be akin to watering wild game. Since there is no FWP interest involved, the only question is whether the use can reasonably be quantified. DNRC should undertake some further study of this question.

By limiting private fish and wildlife appropriations to those that can reasonably be quantified, DNRC would take a more restrictive stand towards these uses than does the Water Court for pre-1973 rights. At present, Water Court policy seems to be to recognize and grant all private fish and wildlife claims, although no quantity of water is specified beyond the "minimum necessary" for the use. The DNRC policy would reflect the 1973 Water Use Act's mandate to document and quantify post-1973 water uses. Based on the Act, DNRC can justify rejecting unquantifiable private fish and wildlife claims.

In conclusion, DNRC should proceed by rulemaking to delimit acceptable private fish and wildlife uses. The options suggested in this memo are based on the general legal effect of the quantification problems with these uses, and on an analysis of the overlapping interests of FWP. Rules restricting private fish and wildlife appropriations will be defensible in court if they have a solid legal grounding in the Water Use Act, and are a result of express DNRC studies of the various quantification problems.

DEPARTMENT OF NATURAL RESOURCES
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To: Kathy Olsen, Regional Manager
Kalispell Water Resource Office

From: Russell Levens, Hydrosciences Section Supervisor
Attila Folnagy, Groundwater Hydrologist
James Heffner, Hydrologist
Water Management Bureau

Date: March 13, 2018

RE: Legal availability of groundwater in the Flathead Deep Aquifer

The purpose of this memo is to describe the standard practice for evaluating legal availability of groundwater from the deep alluvial aquifer in the Kalispell Valley referred to by Montana Bureau of Mines and Geology (MBMG) as the Deep Aquifer. This memo supersedes a memo by Heffner and Levens (2011) as well as practices applied in the Kalispell Valley prior to 2011. The reason for the break from past practices is the availability of new information on physical availability of groundwater from an estimate of recharge to the deep aquifer provided by the MBMG. Previous evaluations of legal availability took advantage of the best information available at the time; however, the availability of estimates of physical availability from an independent source is more rigorous.

An evaluation of physical availability of groundwater used to evaluate legal availability of groundwater will be based on an estimate of inflow to the Deep Aquifer of 213,000 AF from Wheaton et al. (2016). An evaluation of legal demands from wells completed in the Deep Aquifer for comparison to physical groundwater availability will be based on information from the MBMG's Groundwater Characterization Program and an ESRI GIS ArcMap project. In the ArcMap project, a boundary of the Deep Aquifer used to select wells to be included as legal demands is delineated by the 100-foot depth to bedrock contour from gravity surveys by Konizeski et al. (1968) and interpretation by Smith (2000A). Groundwater water rights with depths listed in the DNRC Water Right Database between the depth to the deep alluvium (Smith, 2000A) and the depth to the bedrock (Smith, 2000B) will be assigned to the Deep Aquifer. Groundwater rights without depths in the DNRC Water Right Database will be assigned to the Deep Aquifer.

WATER RESOURCES DIVISION

WATER RIGHTS BUREAU

TO:	WATER RESOURCES MANAGERS AND SPECIALISTS
FROM:	MILLIE HEFFNER, CHIEF, WATER RIGHTS BUREAU
SUBJECT:	**HB 52 (EFFECTIVE 10/1/2011)**
DATE:	SEPTEMBER 14, 2012
CC:	TIM DAVIS

"An act providing rulemaking authority to the Board of Environmental Review to regulate reclaimed wastewater from public sewage systems…"

"75-6-103. Duties of board.
(2) The board shall, subject to the provisions of 75-6-116 and as provided in 75-6-131, adopt rules and standards concerning:

(k)(iv) a requirement that an applicant who proposes to use reclaimed wastewater pursuant to this subsection (2)(k) has obtained any necessary authorizations required under Title 85 from the department of natural resources and conservation

Below is a general discussion of the applicability of §75-6-103, MCA. Each case is fact specific and the following are offered only as general guidelines.

Situations when a new water right is not required before reusing wastewater:

A new water right is not required if the disposal or discharge of effluent from a public sewage system as defined in 75-6-102, MCA, is part of the method of treatment and is employed in response to state or federal regulatory requirements. This statement generally applies to water rights reflected in statements of claim and would rarely apply to any permit issued after the Supreme Court's decision in the Trout Unlimited case (2006). The method of treatment may be to discharge water into a water source or discharge the water onto the ground, or into a pit. If the treatment is to discharge water onto the ground and there is no intent to use the water beneficially, even though a benefit may occur as a result of where the water is discharged, a permit is not required. The effluent could be land applied onto a golf course or other land that may be hayed, used to grow trees, or used as pasture and a new water right would not be required. It does not change the decision as to a new permit requirement if the ground is located inside or outside of the place of use.

Situations when a water right is required before reusing wastewater:

If someone wants to put the effluent to use after the water right holder has finished treatment of the water, then a new water right is required. It does not matter if the ground on which it is applied is located inside or outside of the place of use.

Examples:

Example:
A water right is required if an entity with a public sewage system sells its wastewater to an irrigator to irrigate outside of the entity's historic place of use. However, a water right is not required if the entity leases the land from the irrigator in order to dispose of their wastewater.

Example:
A water right is not required if an entity with a public sewage system sells its wastewater via a water depot as long as they have historically had such a system in place and it is within the historic place of use. However, a water right would be required if the depot is outside of the historic place of use.

Permits issued after the Trout Unlimited Decision

Many newer groundwater permits (post HB831) base their net depletion analysis on their type of wastewater treatment and associated return flows. If they alter their treatment system/return flow pattern in the future then they may be in violation of their permit and/or mitigation plan. If it is found that additional mitigation water is needed to compensate for a new reduction in wastewater return then a permit modification and a new change application would be required.

Memorandum of Understanding (MOU)

DEQ and the DNRC have entered into a MOU in order to establish a process for determining when approval by DNRC is necessary prior to DEQ's approval of a proposal to use reclaimed wastewater.

Upon receipt of an application to use reclaimed wastewater, DEQ will notify the applicant that a copy of the application must be forwarded by the applicant to DNRC's Water Rights Bureau for a determination on whether an authorization under Title 85 will be required. If the application is sent to the Central Office, it will be forwarded to the appropriate regional office for review. Once the application and any pertinent water rights have been reviewed, the regional office shall draft a letter stating either that:

(a) no authorization under Title 85 is required;
(b) the applicant already has the appropriate authorization under Title 85; or
(c) the applicant must obtain an authorization from DNRC under Title 85 prior to DEQ's approval.

The regional office shall send the draft letter to the Central Office for review. The regional office will send the final version of the letter to DEQ and the applicant. The DNRC must inform the applicant and DEQ in writing within 45 days after receiving the application.

Department Of Natural Resources and Conservation
Water Rights Bureau
New Appropriations Program

Madison Group Aquifer

Purpose

The purpose of this guidance is to identify areas where DNRC has determined that pumping groundwater from the Madison Group aquifer is unlikely to deplete surface water that is subject to prior appropriation. In the absence of objections and information to the contrary, applicants for wells in the Madison Group aquifer in those identified areas are not required to analyze depletion of surface waters.

Authority

The Department has the authority to issue water use permits for beneficial uses of water under §§ 85-2-302, MCA and to establish procedures, forms and requirements for applications under §§ 85-2-112, MCA. The applicant has the burden under §§ 85-2-311, MCA to show the proposed use is a beneficial use of water, justify the amount of water requested for the proposed purpose, and meet all the criteria for issuance of a permit.

Justification

Proving on an application-by-application basis which surface waters are hydraulically connected to the Madison Group aquifer is difficult, expensive and may be impossible. Evidence from extensive published studies of the Madison Group aquifer [see references listed below] and basic hydrologic principles provide a scientific basis on which DNRC has identified general areas and circumstances where groundwater pumping of the Madison Group aquifer will not deplete surface water. The proposed guidance should reduce unnecessary analysis and clarify the analysis that is necessary to evaluate the impacts of wells in the Madison Group aquifer on surface water users.

Boundary

The boundary on the attached map is the area outside of which applicants are <u>not</u> required to analyze depletion to surface waters, subject to limited exclusions. The area inside the boundary where analysis of depletion to surface water is required is delineated by locations of:

- outcrops of the Madison Group aquifer,
- known areas of discharge from the Madison Group aquifer, and
- faults that offset the Madison Group aquifer.

The boundary will be adjusted if justified by new information from groundwater investigations or objections to water right applications.

Requirements

Applicants for wells completed in the Madison Group Aquifer within the mapped area must identify hydraulically connected surface waters and calculate the rate and timing of depletions to those affected reaches. Applicants must evaluate legal availability of surface water and the potential for adverse effects to surface water right holders in the potentially affected reaches. Surface waters of concern within the boundary of the mapped area include at a minimum Giant Springs and the Missouri River in the Great Falls area, and Big Springs and Warm Springs in the Lewistown area.

Applicants for wells completed in the Madison Group aquifer outside of the mapped area will not need to calculate depletion to surface water, except as explained below. Applicants may refer in the Application generally to this guidance and the referenced studies and analyses.

Exclusions from Application Procedure

Applicants for wells in the Madison Group aquifer located south of the Yellowstone River are excluded from this guidance until conditions in the Madison near the Bighorn and Pryor Mountains are evaluated more closely. Applicants for wells south of the Yellowstone River must evaluate hydraulic connection of the aquifer to surface water and calculate the rate, timing and location of stream depletion the same as in other areas outside the boundaries identified in the attached map.

Applicants for wells in closed basins subject to §§85-2-360 through §§85-2-364, MCA also are excluded from this guidance. They must submit a hydrogeologic assessment as described under §§85-2-361, MCA that predicts whether their proposed use will deplete surface water.

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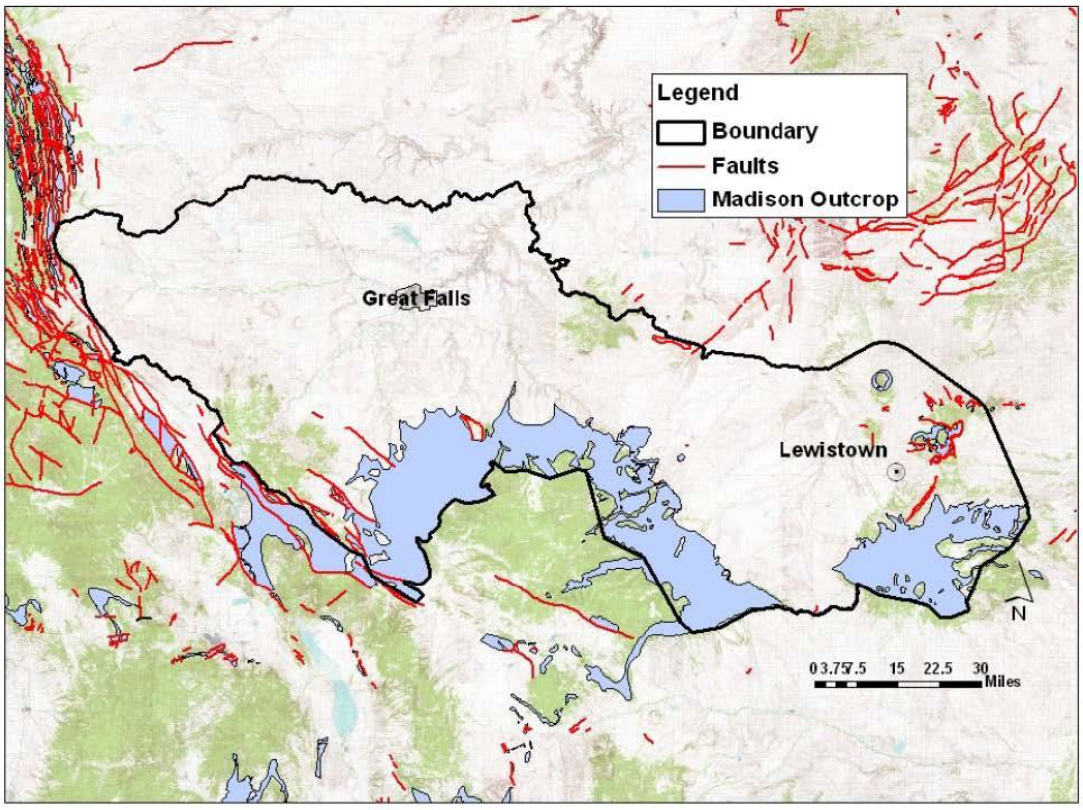

Area outside of which DNRC has determined that pumping from the Madison is unlikely to deplete surface water.

Mitigating Adverse Affect Memo

WATER RESOURCES DIVISION

WATER RIGHTS BUREAU

TO:	WATER RESOURCES MANAGERS
FROM:	TERRI MCLAUGHLIN, CHIEF, WATER RIGHTS BUREAU
SUBJECT:	**ADVERSE AFFECT DETERMINATION [MCA 85-2-311, 360]**
DATE:	NOVEMBER 2011
CC:	TIM DAVIS

The Department is required under MCA 85-2-360 to make a determination of adverse affect caused by a ground water appropriation in closed basins based on the following.

> *(5) For the purposes of 85-2-360 through 85-2-362, the prediction of net depletion does not mean that an adverse effect on a prior appropriator will occur or if an adverse effect does occur that the entire amount of net depletion is the cause of the adverse effect. A determination of whether or not there is an adverse effect on a prior appropriator as the result of a new appropriation right is a determination that must be made by the department based on the amount, location, and duration of the amount of net depletion that causes the adverse effect relative to the historic beneficial use of the appropriation right that may be adversely affected.*

The purpose of this memo is to explain how flexibility, under 85-2-360, can be applied to the timing (duration) of mitigation when analyzing adverse affect and legal availability. This flexibility can be applied where the existing legal demands include storage and hydropower water rights.

Mitigation or aquifer recharge that does not match the timing of depletion may be acceptable where a prior appropriator utilizes storage for their appropriation. The mitigation water left instream can be captured in storage to satisfy the prior appropriator and may offset the depletion to the source caused by a groundwater appropriation.

Regional Office Managers may find that there is no adverse effect to a prior appropriator when reviewing and approving a mitigation or aquifer recharge plan if:

1) The adverse effect and the concern with legal availability is only to a storage or hydropower right;
2) The plan offsets the entire amount of the adverse effect and the impact to legal availability; and,
3) The plan offsets the adverse effect and provides legal availability cumulatively throughout the year.

When all three conditions above are met, Regional Managers may approve a mitigation or aquifer recharge plan even if mitigation water is provided only during a portion of the year (such as irrigation season) because the storage component allows net depletion and impact to the storage/hydropower right to be offset year-round.

DEPARTMENT OF NATURAL RESOURCES
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To: Kim Overcast, New Appropriations Manager
From: Tim D. Hall, Chief Legal Counsel TDH
Date: December 21, 2007
Re: Stockwater Pits and Reservoirs – Pre-1973 and Post-1973

The Montana Water Use Act of 1973 established a permit system for new uses of water. Any person planning a new or expanded development for a beneficial use of water from a surface water source must obtain a Permit to Appropriate Water prior to the water being put to use. The permit system is administered by the DNRC. The Water Use Act at Mont. Code Ann. § 85-2-306 (6) & (7) has a special provision for obtaining permits for completed stockwater pits or reservoirs. If the pit or reservoir meets the following criteria, construction can begin immediately. The stockwater pit or reservoir must be located on a non-perennial stream, have a capacity of less that 15 acre-feet of water, and an annual appropriation of less than 30 acre-feet. The pit or reservoir must also be constructed on a parcel of land that is 40 acres or larger which is owned or under the control of the applicant. The proper form to file with the Department for a new water right under the above provisions is a Form 605, application for Provisional Permit for Completed Stockwater Pit or Reservoir.

The Department will not process Form 605 applications for Provisional Permit for Completed Stockwater Pit or Reservoir on federal land when the application is received in the name of the grazing permit holder. The water right must be in the name of the federal agency. The same applies for developments on state land. A federal grazing permit does not constitute control of the land. The grazing permit holder does not control other individuals from entering the land for other purposes nor do they control any resources on the land. The federal agency has control of the land, including control of the grazing. The grazing permit dictates how many animal units will occupy a pasture, when the animals will be allowed to enter the pasture, and how long they will be allowed to stay. Grazing permit holders can also be told to remove the animals at other times, such as when the condition of the pasture is severely degraded due to drought. The grazing permit holder agrees to these terms by signing the grazing permit. Failure to adhere to the terms of the grazing permit can result in cancellation of the permit and trespass charges filed against the permit holder.

CENTRALIZED SERVICES DIVISION (406) 444-2074
CONSERVATION & RESOURCE DIVISION (406) 444-6667
RESERVED WATER RIGHTS COMPACT COMMISSION (406) 444-6841
OIL & GAS DIVISION (406) 444-6675
TRUST LAND MANAGEMENT DIVISION (406) 444-2074

Because of the variety of private leases with varying levels of "control of the land," the Department requires written permission from the landowner when a Form 605 is filed for a water right in the name of the private lessee.

There has been some confusion of late between Form 605 filings, Form 627 filings, and issues of how certain unclaimed water rights get adjudicated. The Department has been receiving numerous improper Form 627 "Notice of Water Right" filings and copies of papers filed at the courthouse attempting to "claim" stockwater pits and reservoirs. Unlike a Form 605, which is for a new water right, a Form 627, which has been discontinued as of Jan. 1, 2008, was merely a *notice* form provided by the Department for the filing of some sort of claim to a pre-1973 water right that was exempt from the filing requirements of the statewide general stream adjudication ("Claims for existing rights for livestock and individual as opposed to municipal domestic uses based upon instream flow or ground water sources…." Mont. Code Ann. § 85-2-222. All existing pre-July 1, 1973, water rights not meeting the exempt definition were to be filed with the Department during the claim filing period of 1979-1982. Stockwater pits and reservoirs were not exempt from adjudication filing requirements. The Montana State Supreme Court early on in the adjudication issued a water rights order stating that "failure to file a claim as required by law will result in a conclusive presumption that the water right or claimed water right has been abandoned" MCA 85-2-212. Existing water rights that were not filed as statements of claim during the claim filing period, or were not exempt from filing, were later deemed by the Supreme Court to have been forfeited. *Matter of Yellowstone River*, 253 Mont. 167, 832 P.2d 1210 (1992).

Therefore, a Form 605 is for filing for new surface water rights for stockwater pits and reservoirs. Pre-July 1, 1973, stockwater pits and reservoirs needed to be claimed in the adjudication or were forfeited. For water rights exempt from the filing requirements of the adjudication, claims for existing rights for livestock and individual as opposed to municipal domestic uses based upon instream flow or ground water sources, a Form 627 could formerly be filed with the Department to give notice that the filer claimed such a right. A Form 627 does not constitute a claim that the Water Court will adjudicate. The legislature has not yet made clear where or when someone who did not voluntarily file a water right exempt from the filing requirements of the adjudication can file their claim and have it adjudicated. It is clear, however, that anyone who filed a Form 627 has not placed their water right before the Water Court for adjudication and no such water rights claimed on that form will be included in water right decrees.

Water users should contact attorneys of their choice for advice on the handling of their water rights.

Thompson Falls Lumber Co. Memo

DEPARTMENT OF NATURAL RESOURCES
AND CONSERVATION

BRIAN SCHWEITZER
GOVERNOR

DIRECTOR'S OFFICE (406) 444-2074
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STATE OF MONTANA

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MEMORANDUM

To: Bill Schultz, Missoula Regional Office Manager
Terri Eccles, Kalispell Regional Office Manager
Terry McLaughlin, Water Rights Bureau Chief
Kim Overcast, New Appropriations Supervisor

From: John E. Tubbs, Administrator

Re: Permitting in the open Clark Fork and Flathead basins.

Date: June 9, 2008

Over the last year-and-a-half the Missoula and Kalispell Regional Offices have been instructed to review each new water permit application on a case-by case basis relative to the Thompson Falls Lumber Company (TFLC) decision. Discussions between our technical and legal staff have been ongoing. As indicated by memorandum documenting various meetings, the case-by-case process is not proving to be effective for field staff. Added to this, the Bostwick case focuses the agency in a direction to make criteria decisions early in the process rather than at the end, in certain areas of the State.

The receipt of a letter from Avista Corporation (June 4, 2008) confirmed a direction that I have been moving toward over the last four months. That position being that the TFLC is precedent setting, but did not close the basin to further appropriations. This is the first permit application that Avista Corp. objected to under the Water Use Act in the Clark Fork basin, and the objection prevailed. It is precedent setting to the extent that the facts brought to the case by Avista Corp. proved that the 250 gallon per minute, 400 acre-feet per year, use of surface water in the lower Clark Fork would adversely affect their senior hydropower rights. Avista clarified their concerns regarding new appropriations to the Department. The lower Clark Fork and Flathead River basins remain open to appropriations.

The TFLC case specifically addresses the effects of a new surface water diversion just upstream of the City of Thompson Falls and within 10 miles of Noxon Reservoirs upper shores. As mentioned above, the facts in the case demonstrate that a diversion near the reservoir causes adverse affect. The letter from Avista Corp. identifies the specific issues with the TFLC application that concerned the objector.

However, the letter also indicates areas where Avista, at this time, does not believe new uses will cause adverse effect. In part this may be due to the mitigating effect of storage behind Kerr Dam in Flathead Lake and behind Hungry Horse Dam. These two large storage facilities are managed based on specific rule curves and flow regimes. In other words, stream flows at Noxon Rapids are in large part managed flows (without regard to natural flow), except during high flow events. As a result, the impacts attributed to new diversions upstream of the confluence of the Clark Fork and the Flathead Rivers are diminished by the off-setting effect of storage.

For these reasons, regional offices should limit their use of the TFLC case as precedent to: new applications for surface water in the open Clark Fork River and tributaries, excluding the Flathead River and its tributaries upstream of the Flathead Indian Reservation Boundary. Again these basins are open. All appropriations must still be evaluated based on the requisite criteria, including ground water appropriations that may have an adverse effect on the ability of surface water right holders to exercise their rights.

The Department is precluded from issuing any permits within the Reservation. On-going negotiations with the Salish and Kootenai Tribes will define the availability of water in the lower Flathead Basin.

Finally, TFLC should be seen in context with the efforts the State is undertaking to seek 100,000 acre-feet of stored water in Hungry Horse Reservoir. This is a forward- looking effort but speaks to the commitment to protect all senior water rights, including hydropower. Ultimately, future water uses could have Hungry Horse storage available for mitigation water in the Clark Fork Basin.

The State constitution requires protection of senior water rights but it also recognizes the "use of all water" (Article IX, Section 3 (2), MCA). The approach outlined in this memo represents the balance of these two provisions based upon the information available. All applications must meet the 85-2-311 criteria; however, only a subset, as described above, are directly impacted by TRLC.

The Department is also issuing a new rule confirming that mitigation of surface water depletions is an acceptable method of preventing adverse affect associated with new uses. Not all water uses will fit within the sideboards that this memo provides. Either internal to a watershed, or for larger uses along the lower Clark Fork River, mitigation remains a viable method to overcome impacts to senior water right holders. This is standard operating procedure for the Department; the new rule will make it clear to the public that mitigation is a viable option.

HB99 Guidance – Limited Analysis of Adverse Effect

To: Water Resource Managers and Specialist
From: Water Rights Central Office
Subject: HB 99 Implementation and Guidance
Date: August, 2017
CC: Jan Langel, Division Administrator

Short Title:

"AN ACT LIMITING ANALYSIS OF ADVERSE EFFECTS FOR CERTAIN WATER APPLICATIONS; ALLOWING WATER RIGHT HOLDERS TO CONSENT TO APPROVAL OF CERTAIN WATER RIGHT APPLICATIONS; AMENDING SECTIONS 85-2-306, 85-2-2311, 85-2-320, 85-2-360, 85-2-402, AND 85-2-408, MCA; AND PROVIDING A TERMINATION DATE."

Overview:

HB 99 allows for a water right owner(s), whom may be adversely affected by a permit or change application, to provide written consent to the approval of the application. If the water right owner(s) provide written consent, then the Department will not conduct an adverse effect analysis on the consenting water right. Written consent to an application does not necessarily waiver the right to make call on other junior water users. Be absolutely sure that by providing the applicant with written consent of approval of their application, the water user isn't shifting the burden to make call on another user. It is anticipated that the use of HB 99 will be limited considering the potential that the consenting water right could shift the burden of call on to other water users and the requirement that the applicant still prove water is legally available. It is unlikely HB 99 would be used for a new surface water right because if water is legally available, it is unlikely the new use will cause adverse effect so long as the new water user can respond to call.

Important Notes: The written consent to approval of application applies to permit and change applications. Although HB 99 amends 85-2-306(7) to state the department may not consider adverse effects on any water right identified in a written consent to approval; the department does not currently conduct an adverse effect analysis for stock water pit application filed on under this statue. It is not a deficiency to the application in the situation where written consent is provided by some existing users, but there may be others which could be adversely affected that have not provided written consent. HB 99 directly applies to criteria for issuance of a permit/change and therefore consent forms are not looked at until after a "Correct & Complete" determination.

Please meet with Central Office and Legal Staff about situation other than the examples below, before communicating about the appropriateness of the situation(s) with applicant(s).

HB 99 FAQ:

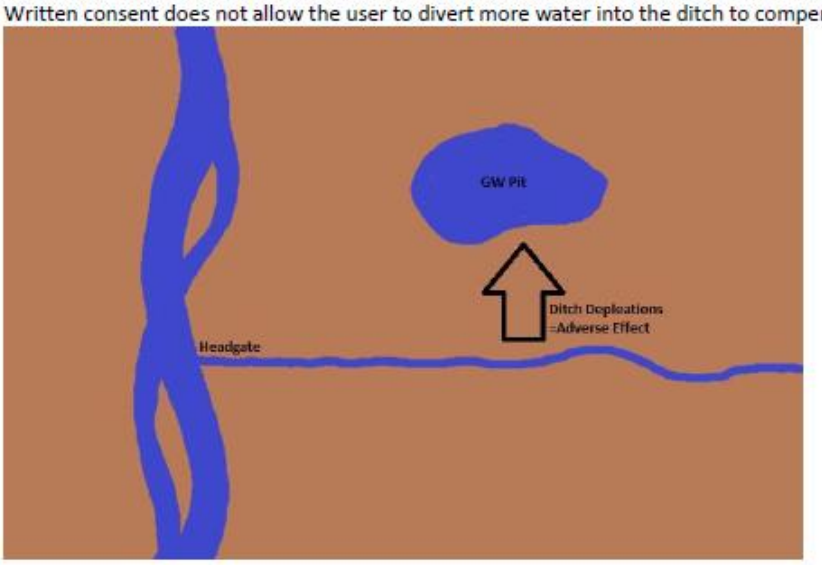
Who has to sign consent waivers?	Anyone whom has a water right the Department finds might be adversely affected as part of a water right application. In situation 1, every single water right holder on the ditch must sign. In situation 2, every single water right holder on the source and downstream tributaries must sign.
Do we have an example for a change application?	No, Meet with Central Office and Legal Staff before communicating about the appropriateness of other situations with applicants.
Can you consent to your own water right(s)?	Only if you are the most junior water right(s) on the entire source and downstream tributaries. Otherwise you need consent from all downstream juniors.

Examples of Appropriate Use:

At this point in time the Department has only two example situations where this consent mechanism might be effective as seen in the table below. If you believe you have in a situation that is different than these examples and still might work, then you need to set a meeting up with Central Office and legal staff as soon as possible to review the merits of your situation.

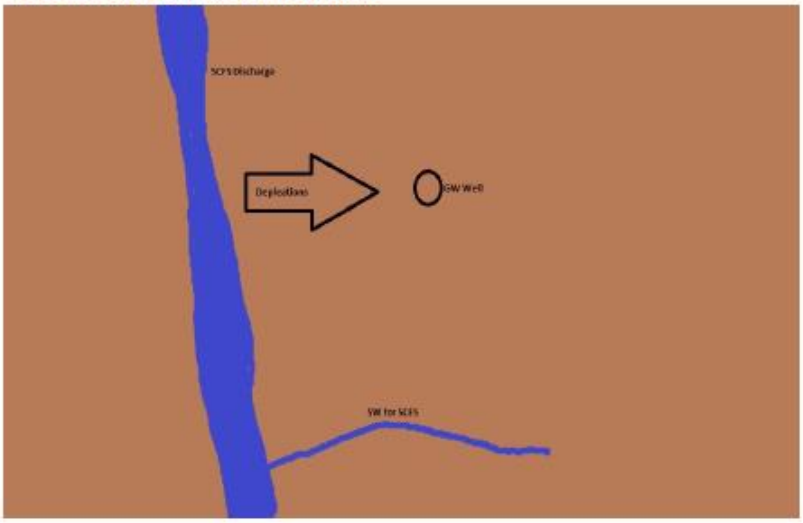
Situation 1:

GW pit depletes surface water in a ditch after it has been diverted from the source and either does not deplete the surface water source, or surface water is legally available on any depleted surface water source. In that scenario, if the only potential adverse effect is to water rights after they have been diverted into the ditch, a written consent from the owner(s) of water right(s) in the ditch would likely authorize issuance of a permit if all of the other criteria are satisfied. Written consent does not allow the user to divert more water into the ditch to compensate for the depletions.



Situation 2:

GW well depletes SW and the only potential adverse effect is to the most junior water user on the source. A written consent by the most junior water user on the source would likely authorize issuance of a permit if all of the other criteria are satisfied, including legal availability.



Example when it shifts the burden and is not appropriate use:

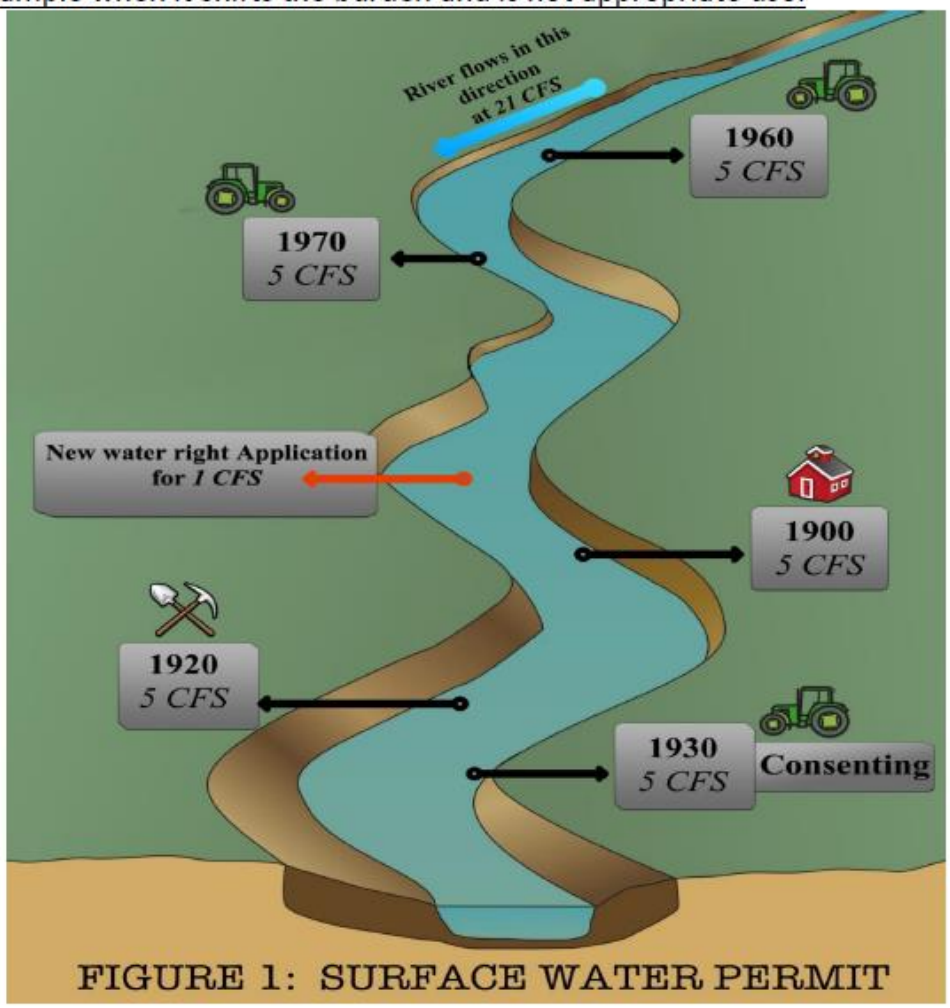


FIGURE 1: SURFACE WATER PERMIT

FIGURE 1 DISCUSSION:

Total Physical Water Availability: 21 CFS

Physical Availability at the Point of Diversion: 11 CFS (21 CFS- 5 CFS - 5 CFS = 11 CFS)

Legal Availability at Point of Diversion: - 4 CFS (11 CFS- 5 CFS - 5 CFS -5 CFS = -4 CFS)

Total Surface Demands After Permit: 26 CFS (5 CFS + 5 CFS + 5 CFS + 5 CFS + 5 CFS + 1 CFS)

Total Legal Availability After Permit: -5 CFS (21 CFS – 26 CFS = - 5 CFS)

For purposes of this example, the 1930 water right consents to approval of the new permit application.

A) Even though the 1930 water right consented to the new permit, it remains a valid water right and legal demand of 5 CFS on the source. Assuming the consenting water right is still considered for legal availability, the new permit cannot be approved because the legal demands exceed the amount of water available in the source (no unappropriated water is available for the new permit). If the consenting water right is not considered in legal availability then the analysis does not accurately reflect the existing water right demands on the source.

B) If the consenting water right decides to make a call, can it call the new permit it consented to? Assuming it can't call the new water right that it consented to, the burden of any water shortage and call is shifted to other water rights. For example, before the new permit was granted the 1970 water right was required to reduce his diversion to 1 CFS to satisfy call by the 1930 water right. Under the new conditions with the new permit on the source the 1970 user has to completely discontinue diverting to satisfy the call from the consenting water right. The 1970 water user has no remedy to call the new permit as it is downstream.

C) If the new permit is a groundwater well that depletes the surface water source at a constant rate of 1 CFS, the potential for adverse effect is increased. Even if the consenting water right can still theoretically call the new permit, a call would be ineffective because of the delay between shutting off the well and ceasing depletions to surface water. So, the consenting water right is going to call the 1970 water right and it will bear the burden of the new depletions to the source.

Variance-Missoula Valley Geothermal/Heat Exchange Wells

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To: Missoula Water Resources Regional Office

From: James Heffner, Hydrogeologist
Water Management Bureau

Date: March 10, 2010

RE: Variance - Missoula Valley Geothermal/Heat Exchange Wells

In regard to future requests that you receive for variance from aquifer testing requirements (ARM 36.12.121) where the proposed use is for non-consumptive geothermal/heat exchange wells in the Missoula Valley aquifer (see map), which extract and re-inject water to the same aquifer; I recommend that applicants be allowed to forgo the more rigorous aquifer testing and analysis typically required, if they use the following aquifer properties in subsequent evaluations of the criteria:

Transmissivity – 50,000 ft^2/day, Specific yield – 0.10.

Rationale:

1) The Missoula Valley aquifer has been studied extensively and sufficient documentation exists for reasonable estimates of aquifer properties.
2) Aquifer testing at flow rates typically utilized by geothermal/heat exchange systems are usually not sufficient to evaluate aquifer properties at the local scale.
3) The primary concern with geothermal/heat exchange wells are interference effects to nearby wells. The use of a conservative transmissivity value (toward the low end of values appearing in the published literature and estimated from existing aquifer tests) will allow for an adequate evaluation of the potential for adverse effect to nearby groundwater rights.
4) In cases where the specific yield cannot be estimated from an aquifer test, the Department typically utilizes and accepts an assumed specific yield of 0.10 for modeling unconfined systems.

Applicants will still need to perform limited duration testing to address short-term physical availability/adequacy of diversion. This can be me either through the completion of an 8-hour yield drawdown test or comparable well performance testing (step-tests). Longer-term physical availability/adequacy of diversion will need to be addressed via analytical model, including an estimate of well loss.

Applicants will still need to submit the variance request to the Regional Manager. If the variance request is consistent with the parameters described above, the request can be granted without further review from WRD Hydrogeologists. Applicants are not limited to the aquifer properties above, and may submit a formal variance request if they wish to use other local information available, or use an aquifer test that conforms to the aquifer testing requirements (ARM 36.12.121).

Tools, Resources & Training Videos

The Database (Oracle) Training Videos

Montana Water Rights Database and History 

Oracle Forms Basics 

Owner Related Screens 

The Application Screen 

The Water Rights Screen 

The Water Rights Details Screen 

Working with Remarks 

Understanding Related Rights 

The Owner Update Screen 

Reports